



**The Colt factory in Hartford,
Connecticut, circa 1900**

The company is famous for the
“Peacemaker” revolver, but its first sale
was a repeating rifle made in 1836.

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LIFE
EXPLORES



HISTORY OF THE RIFLE

THE WEAPON THAT CHANGED THE WORLD



LIFE
EXPLORES

HISTORY^{OF} THE RIFLE

Well-armed actress
Madge Evans (1909–1981)
posing as the character
Maxine Bennett from the
1935 film *Age of Indiscretion*
(which was actually a contem-
porary romantic drama).



The Delaware regiment of the Continental Army fired their muskets at the Battle of Long Island on August 27, 1776. Oil on canvas by Domenick D'Andrea.



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In the battle for new territory, lawmen, outlaws, soldiers, and showmen embraced guns that would become legendary: Colt six-shooters, Winchester lever-action repeaters, and Sharps rifles.

1 | BLACK POWDER, ALCHEMY, AND BOMBARDS

The earliest weapons were defined by human strength and ingenuity. Then came the discovery of a history-changing chemical reaction.





A painted silk banner from the 10th century shows Buddha being attacked by demons, one of whom is holding a gunpowder tube.

AN EXPLOSIVE POWER

The exact origins of gunpowder are unclear. But early Taoist texts refer to incendiary potions created by alchemist monks.

The story of firearms begins with chemistry: the invention of gunpowder.

For millennia, men expressed hostility by hurling hard objects at each other and stabbing foes with sharpened sticks. Ancient armies besieged enemy castles by harnessing mechanical ingenuity. They launched waves of flaming arrows, enormous stones, rotting animal carcasses, and even stinking loads of excrement.

But the discovery, possibly in 10th-century China, that combining charcoal, potassium nitrate (or saltpeter), and sulfur could cause explosions and, if properly channeled, send matter flying with deadly effect, changed the course of conflict.

ALCHEMISTS SEARCHING FOR IMMORTALITY

The exact timeline of the development of “black powder” is unclear. But Taoist texts from the 9th and 10th centuries include references to the incendiary properties of potions created by alchemist monks. Some sustained burns, and there was at least one report of a workshop going up in flames. For the monks, it was

a hazard of searching for an elixir yielding immortality. For some of the holy men’s contemporaries, however, the black powder may have suggested a way of limiting mortality rather than extending it. It is believed that Chinese of the era had the idea to use black powder in rudimentary bombs, grenades, and land mines against invading Mongols. The Mongols, in turn, are thought to have carried knowledge of black powder across Asia, spreading it through the Middle East and on to Europe.

In 1241, for example, advancing Mongol forces used powder-powered weapons to help trounce defenders of the Kingdom of Hungary and lay waste to their villages during the Battle of Mohi. Ideas moved from the East to the West and soon intermingled with European innovations. The 13th-century writings of English philosopher and Franciscan monk Roger Bacon contain cryptic references to exploding powder, while medieval alchemists across the continent began to experiment with elements of black powder in their attempts to “transmute” lead to gold.

Part of the fascination with these evolving weapons was their





THE MYSTERIOUS FRIAR BACON

In the 19th and early 20th centuries, certain historians identified Roger Bacon (1214–1292) as a major figure in the development of firearms. Some researchers asserted that the Franciscan friar's writings contain a cryptogram describing the ratio of ingredients needed for gunpowder. This view of Bacon fit with a broader impression that he was an early scientist of mystical bent.

While it's possible that Bacon saw a demonstration of Chinese firecrackers, modern historians now doubt that he understood the concept of storing and releasing explosive energy via gunpowder. The passages in question probably did not originate with Bacon, and in any event the mixture described has the wrong proportions of ingredients to power a firearm.



EARLY LOOK In his treatise on siege weapons, 14th-century English scholar Walter de Milemete included what might be the first illustration of a firearm. The weapon, called a *pot-de-fer*, was a primitive cannon made of iron.

terrifying dramatics. Not only did the arms have the capacity to knock down and kill opponents at great distances, but their repeated explosions generated impressive noise, flames, and smoke. The armored knight on a grand steed suddenly had to both carefully watch his back and negotiate threatening new conditions out on the battlefield.

THE BIRTH OF THE CANNON

By the late 13th century, military inventors realized they could use black powder to fire projectiles from an iron tube closed at one end. The

The chemical instability of early gunpowder recipes led to unintended explosions. Crude metallurgy meant cannon frequently burst apart.

cannon (from the Latin *canna*, referring to the hollow stem of a reed) was born. The closed end of the weapon came to be known as the breech. Powder and then a projectile were loaded via the open end, or muzzle. A soldier ignited the powder with a torch or smoldering ember through a touchhole in the rear. Rapidly expanded gases from the explosion propelled the ammunition from the barrel—the same basic principle used in firearms to this day.

Illuminated manuscripts of the era show soldiers igniting vase-shaped weapons firing arrow-shaped



BATTLE OF CRÉCY An illuminated manuscript by medieval French author Jean Froissart included this image of the Battle of Crécy (1346), during the Hundred Years' War. Cannon may have been used in the struggle, but the decisive weapons were the bow, ax, mace, dagger, and sword.

projectiles. Other early cannon propelled carved stones and iron balls to assault castle walls. England's King Edward III used a type of cannon called a bombard against the Scots in the 1320s, and there are reports that cannon were used in the Hundred Years' War.

EXPLODING CANNON

Primitive artillery did not always operate effectively. The chemical instability of early gunpowder recipes led to unintended explosions. Crude metallurgy meant that cannon frequently burst apart. Even

when they worked properly, early muzzle-loaded weapons weren't terribly accurate, and increasingly sophisticated fortifications limited their impact.

Yet the psychological and physical effects of detonation changed the nature of warfare, allowing armies that deployed cannon in numbers to prevail against entrenched targets. By the 15th century, French and Italian artillery makers were producing transportable wheeled cannon used by such rulers as King Louis XI of France and his successor, Charles VIII, to consolidate power. ■

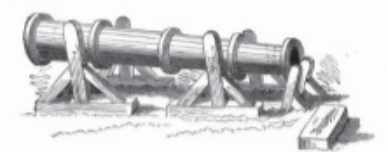
FIREARMS ON THE BATTLEFIELD

Mongol warriors are thought to have carried knowledge of black powder from China, through the Middle East, and on to Europe.

→ **800-900** While searching for elixirs for a longer life, Taoist monks discovered explosive black powder.

→ **1241** Europeans encountered black powder, brought by Mongols from China, in a battle against the Mongol Empire.

→ **1260** Muslim soldiers packed early cannon with black powder in their conflict with Mongols at the Battle of Ain Jalut.



→ **1346** British forces fighting the French during the Hundred Years' War may have used bombards, an early form of artillery, at the Battle of Crécy.

→ **1453** The arsenal used by Ottoman Turks to capture Constantinople included wheeled cannon. The conquest marked the end of the Roman Empire.

→ **1476** During the Battle of Morat, in which the Swiss faced off against Burgundy, both sides wielded hand cannon.

EARLY CANNON AND ARTILLERY

Military designers began to create cannon that could fire arrow-shaped items, carved stones, iron balls, and more.

As black powder was adopted to fire projectiles, weapon design began to evolve. Metal forgers worked with iron and bronze to create weaponry that varied greatly in caliber, mobility, range of fire, angle of fire, and firepower. Early cannon were loaded at the muzzle and ignited with a smoldering match cord or a red-hot poker.



► DARDANELLES GUN

Country: Turkey

Date: 1464

Length: 17 ft.

Bore: 25 in.

This 18-ton bronze bombard was constructed in two parts (the rear powder chamber is shown at right), and its projectiles could smash fortress walls a mile away.

Cannonballs from the 1522 siege of Rhodes.

► 16TH-CENTURY BRONZE GUN

Country: Germany

Date: 1570

Length: 5 ft. 10 in.

Bore: 1.6 in.

This gun was embossed with a warning: "Who tastes my eggs won't find them pleasant."



Two side-mounted pegs facilitated wheeled transport.



◀ 15TH-CENTURY BRONZE CANNON

Country: France

Date: 1478

Length: 7 ft. 3 in.

Bore: 9.6 in.

This 1.6-ton bronze cannon, a technological leap over its iron-forged predecessors, likely required 10 times its weight in charcoal to melt the bronze.

The breech could hold up to 150 pounds of powder.



The barrel is crowned by an intimidating monster head.



◀ 15TH-CENTURY BOMBARDS

Country: Great Britain

Date: circa 1430

Material: wrought iron

In 1434, during the Hundred Years' War, the British army abandoned these twin bombards on the coast of France.





▲ IRON HACKBUT

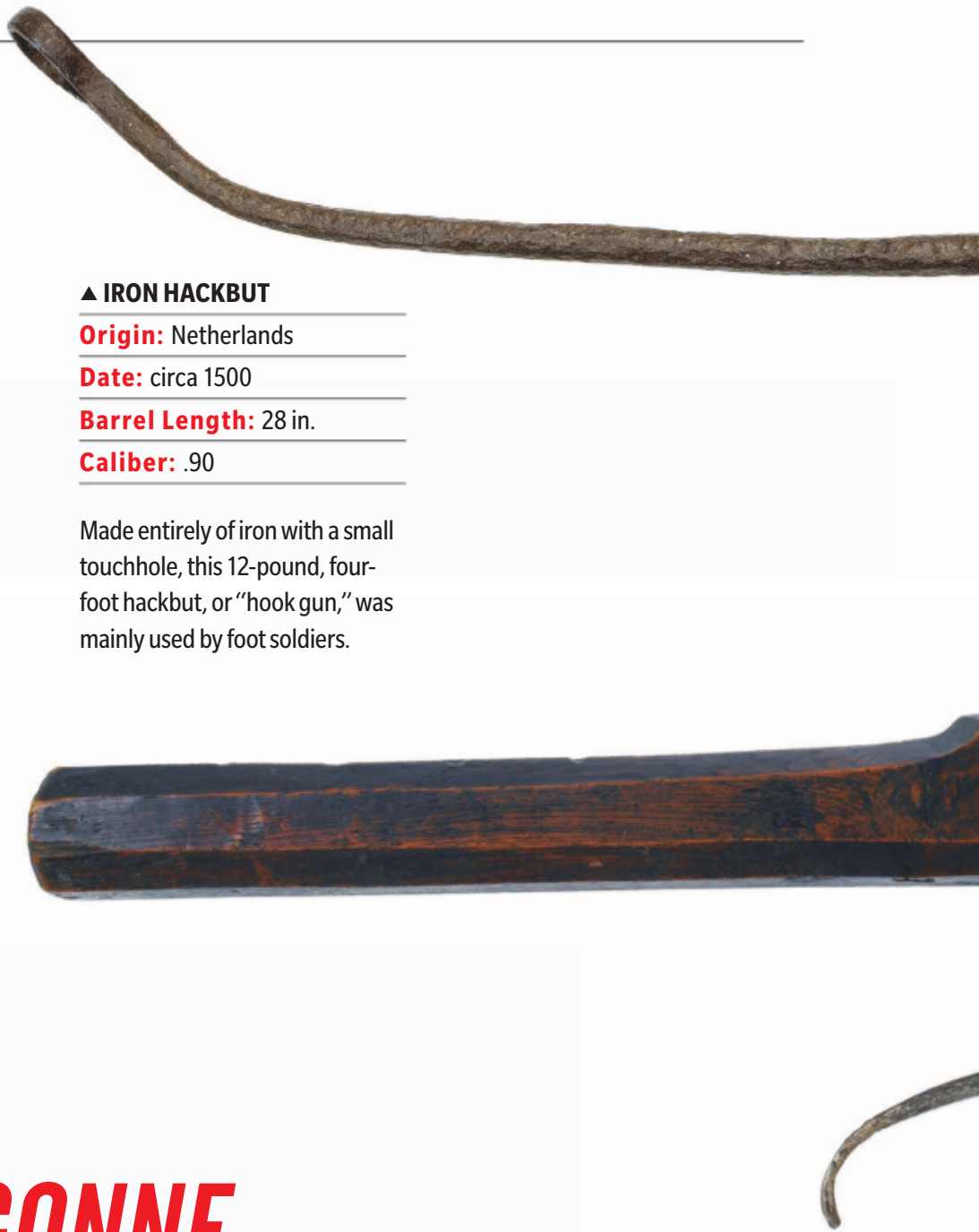
Origin: Netherlands

Date: circa 1500

Barrel Length: 28 in.

Caliber: .90

Made entirely of iron with a small touchhole, this 12-pound, four-foot hackbut, or “hook gun,” was mainly used by foot soldiers.



ENTER THE *HAND GONNE*

Portable firearms were a big step forward on the battlefield, but it often took two soldiers to fire them.

Parallel with the spread of cannon technology came the invention of portable muzzle-loaded firearms suitable for use by individual infantrymen.

This miniaturization of gunpowder weapons led to the widespread introduction in the 15th century of “hand cannon,” also known as *hand gonne*s. Soldiers held these crude forerunners of modern firearms under the arm or braced against a shoulder. Some early models, heavy and ungainly, had to be steadied on a stake and required two men to aim and fire. The user ignited the powder by means of a smoldering

length of cord, or “slow match,” susceptible in wet weather to becoming soggy and unusable.

By contemporary standards, the one-man 15th-century French *hand gonne* barely resembled a firearm at all. It consisted of just a small, smoothbore iron barrel one inch or so in diameter attached to a flat wooden stock by means of thick iron bands. Soon, though, hand cannon assumed the rough shape of a modern pistol, with a grip that bent downward from the barrel at roughly a 30-degree angle. Both the Swiss Confederate Army and their opponents, the soldiers of French

ruler Charles the Bold, Duke of Burgundy, used such pistols during the Battle of Morat (1476). By the 16th century, craftsmen in Spain and elsewhere were fashioning hand cannon from bronze and decorating them with animal imagery and other flourishes. For those who could afford it, the firearm became a work of art.

THE FORCE OF THE ARQUEBUS

The earliest weapon vaguely resembling a modern long gun—a firearm with a wooden stock and extended barrel—was known as the arquebus and appeared in the early 1400s. The weapon was also known as a harque-



A tiller was used to brace the weapon against the body or a solid object while firing.



▲ 15TH-CENTURY ARQUEBUS

Origin: Europe

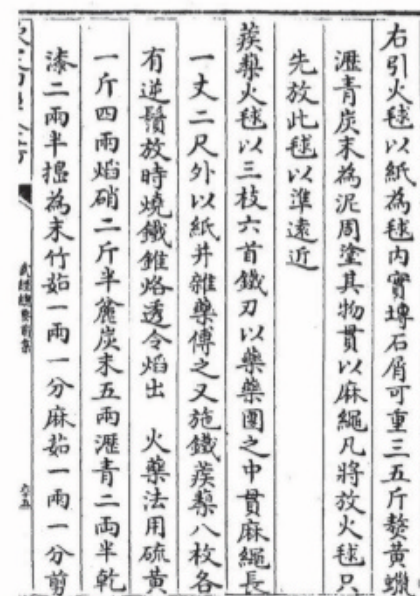
Date: 1470–1500

Barrel Length: 40 in.

Caliber: 1.2

Christopher Columbus conquered the New World with similar weaponry.

An iron barrel supported by a strong wooden stock was a significant step toward modern gunmaking.



bus, harkbus, or hackbut, from the Dutch *haakbus*, meaning “hook gun.”

Typically, an arquebus was muzzle-loaded by a soldier who packed it with powder and a lead ball, then ignited the powder by means of a handheld match cord—an approach that did not solve the difficulty of shooting in damp conditions. It had an iron smoothbore barrel of perhaps 40 inches in length that was connected to a wooden stave (a narrow block) that the soldier would clamp under his armpit to stabilize the weapon as he fired it. (In time, the stave, designed for greater comfort and ease of use, evolved into the

familiar wooden shoulder stock.)

Arquebuses achieved impressive force and penetration. Modern-day experiments with replicas have shown that when they worked, the weapons could hurl an iron ball that pierced steel 1.5 millimeters thick. On the downside, they were inaccurate, a problem designers attempted to solve by including a hook near the mouth of the barrel to place over a wall or other stable object.

By the 16th century, gun designers had improved firing systems so that the arquebus and its successor, the musket, were easier to handle and somewhat more reliable. ■

JUST ADD SALTPETER

It took many centuries for early experimenters to perfect recipes for effective gunpowder consisting of sulfur and charcoal, both fuels, and saltpeter, an oxidizer. An 11th-century Chinese text, *Wu Ching Tsung Yao* (Complete Essentials from the Military Classics), refers to mixtures used in firecrackers, as well as rudimentary flamethrowers and rockets. The formulas, scholars determined, allowed for incendiary effects—the ignition of flame—but not the gas-releasing explosions needed to propel a projectile. The problem? Insufficient saltpeter.

HAND CANNON

These weapons were crude forerunners to modern firearms.

Over time, simple hand cannon evolved into harquebuses—muzzle-loaders with an underside hook that could be used to steady the weapon on a wall or portable support. Some also featured a wooden shoulder stock that functioned as a brace. Echoes of this design element can be seen in the modern gunstock.



The “tail” functioned as a handle.

▼ MEDIEVAL HAND CANNON

Origin: Europe

Date: circa 1350

For ammunition, fighters often packed this hand-forged gun with stones and nails.

This early firearm was excavated from the grounds of a German castle.



◀ FIRE STICK

Origin: Western Europe

Date: circa 1380

Barrel Length: 6 in.

Caliber: .78

To use the fire stick, also called a Bâton à feu, a soldier inserted a wooden pole into the breech.



► METAL HANDGUN

Origin: China and Korea

Date: 17th century

This three-barrel gun was often used as a signaling device, but it may also have been used on the battlefield.





◀ HAND CANNON

Origin: Europe

Date: late 15th century

Barrel Length: 7¼ in.

Bore: .625

This band-reinforced cast-iron gun weighed only 1⅛ pounds.



The barrel end has a slightly flared muzzle.



POWDER MAGIC

A hot iron rod placed in the touch-hole ignited the powder to loudly propel projectiles.

2 | MATCHLOCKS AND MUSKETS

Innovative gunsmiths introduced features that made it easier for a single shooter to aim, fire, and hit a target.





Englishmen with muskets battle with Hawaiian Islanders in an engraving showing the death of the Royal Navy's Captain James Cook.



BUILDING A BETTER FIREARM

Gunsmiths in Europe and Asia searched for new ways to ignite black powder, to make weapons easier for soldiers to use, and to increase accuracy.

The proliferation of military and sporting firearms in Europe, Asia, and elsewhere gave rise to a new class of craftsmen whose designs and ambitions drove the advancement of small arms. These gunsmiths searched for more reliable means of igniting powder, more potent formulations of the

powder itself, and ways to make guns easier for a single man to use. Ultimately, designers aimed for weapons that allowed for repeated shots without reloading, and, of course, they yearned to improve accuracy. The next critical chapter in the story of firearms involves the development of the matchlock firing system.

A SLOW BURN

Until about the 16th century, soldiers set off the powder charge for a hand cannon or arquebus by lighting a short length of cord soaked at one end in a chemical, often potassium nitrate (saltpeter), to slow the burning process. The procedure was decidedly awkward: It required the



▲ **EARLY-16TH-CENTURY MARTIAL
MATCHLOCK MUSKET**

Country: Spain

Date: circa 1530

Barrel Type: smoothbore

In 1565, Spain used matchlocks to establish St. Augustine, Florida, the first permanent European settlement in what would become the United States. This gun was designed to be used with a forked rest.



FULL VIEW

**This musket was
muzzle-loaded.**

gunman to balance a heavy weapon while bringing the “slow match” into contact with the gun’s small touch-hole. Then the flame leaped through the opening and lit the powder.

The introduction of the matchlock gun made ignition easier, if not exactly a snap. This new generation of weapons were still muzzle-loaded

by means of a slender wooden “ramrod” used to force powder and a ball down through the barrel into the breech. The shooter then placed a match in a device that was attached to the breech. This “matchlock” held the match in an S-shaped lever known as a serpentine. After lighting the match, the shooter depressed the

trigger, lowering the match to a pan of finely ground powder known as primer. If all went as planned, the primer ignited, causing an explosion that propelled the ball in the direction of the target.

In due course, designers came up with a more advanced, spring-loaded matchlock that

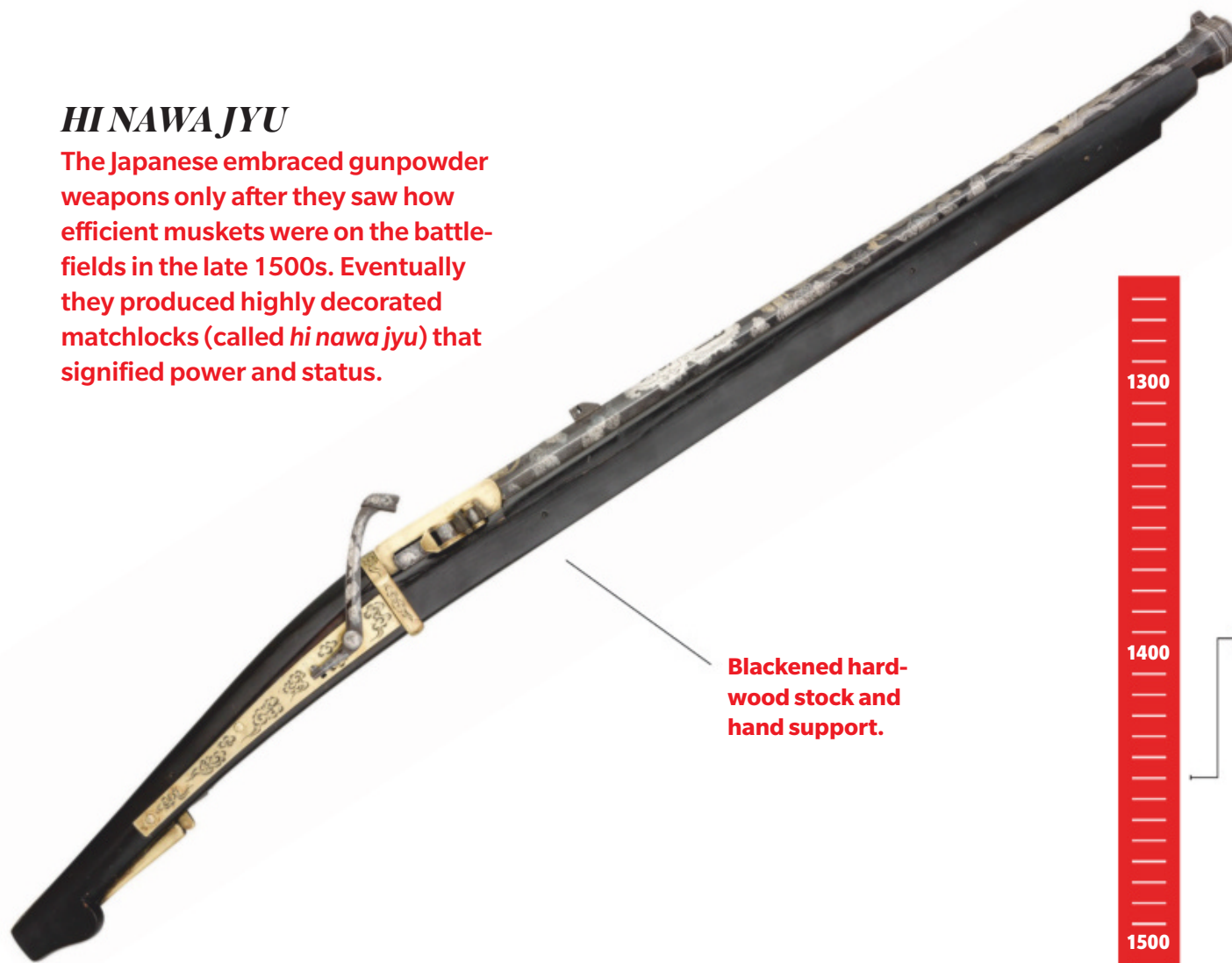
POWDER PLAY

Soldiers armed with matchlock muskets carried a supply of gunpowder in a large flask or a bandoleer of smaller containers. The flask was bell-shaped and often constructed of iron and wood with a fabric covering. The soldier tipped out the proper amount of powder by means of a nozzle at the narrow end of the flask. In the bandoleer version, the musketeer filled small flasks with enough powder to fire his gun once and attached them to a beltlike strap that crossed his torso.



HI NAWA JYU

The Japanese embraced gunpowder weapons only after they saw how efficient muskets were on the battlefields in the late 1500s. Eventually they produced highly decorated matchlocks (called *hi nawa jyu*) that signified power and status.



Blackened hard-wood stock and hand support.

moved the serpentine more swiftly and reliably. But the matchlock mechanism didn't overcome the problems of keeping the match lit in poor weather or preventing the flame from touching the powder prematurely, a common cause of accidental discharge and shooter injury. Another hazard: The light of the smoldering match and ignited powder could give away a soldier's position to the enemy.

Despite its shortcomings, the matchlock remained popular through the early 1700s, in large part because it was relatively simple to operate and inexpensive to make. Some arquebuses were refitted with matchlocks, but as the technology improved, a sleeker triggered weapon, known as a musket (from the French *mosquette*) became increasingly common on European battlefields. King Henry VIII of England ordered 1,500 matchlock guns from craftsmen in the Venetian Republic in 1544. Many of these prized

weapons were lost, having seen little if any service in Henry's army, when the monarch's flagship, the *Mary Rose*, sank the following year in the Battle of Solent.

A DESIGN EVOLUTION

Matchlock designs varied. Some muskets in the 16th century had mechanisms similar to early crossbows, with longer levers that the user pulled upward instead of triggers that moved from front to rear. After Portuguese forces introduced matchlock muskets to Japan, local gunsmiths began producing a version with a short, curved stock and beautiful brass inlay, known as the *hi nawa jyu*. Combatants in the English Civil War (1642–1651) used more workmanlike muskets that were lighter and easier to handle. Later matchlock muskets, with their more attractive finishes and formfitting wooden stocks, began to resemble what we would recognize today as a long gun. ■

A LONG TRANSITION

Between the middle of the 15th century and the dawn of the 20th, warring nations increasingly integrated guns into their arsenals.

1440s Ottoman infantry troops adopted matchlock arms from Hungarians, setting the stage for the weapons to spread through the Turkish empire.



1544 Henry VIII acquired 1,500 matchlock muskets from the Venetians. The British king then lost some of his new arsenal in a shipwreck in 1545.

1550s In a transition from swords and bows, Japanese military leaders began arming soldiers with the *hi nawa jyu*, a weapon adapted from Portuguese muskets.



1640s During the English Civil War, musketeers, vulnerable to charging cavalry, required protection by infantry.

1900s Illustrating the staying power of older technology, nomad Tibetan forces continued to rely on matchlocks in conflicts with Chinese invaders.

MATCHLOCKS

Both the ignition mechanism that held the smoldering match cord and the gun itself could be referred to as matchlocks.

Once a shooter pulled the trigger of a matchlock, an S-shaped lever forced the match cord into a pan of priming powder. When the powder was lit, it produced a flash to ignite the main charge. Even with the new ignition device, weapons were still muzzle-loaded using a ramrod.



English military lock, circa 1690.

An S-shaped lever, or serpentine.

A paddle-shaped buttstock.





▲ MATCHLOCK MUSKET

Country: Sri Lanka

Date: 1690

Barrel Length: 27½ in.

Caliber: .90

The butt of this ornately carved handgun could rest against the shoulder or chest.

▼ MATCHLOCK MUSKET

Country: Austria or Germany

Date: late 17th century

Barrel Length: 47½ in.

Caliber: .90

The tapering barrel was fit with rear and front sights.



FULL VIEW



▼ SNAPPING MATCHLOCK

Country: Italy

Date: circa 1540

Barrel Length: 42 in.

Caliber: .47

Brescia, where this model was made, remains a gunmaking hub today.

A stored ramrod is visible beneath the muzzle.



SPORTING AND HUNTING GUNS PROLIFERATE

For aristocrats and merchants, beautiful weapons became status symbols.

By the mid 16th century, royal, aristocratic, and merchant-class weapon owners were commissioning long guns for nonmilitary sporting purposes. With increasingly elaborate features, these firearms nodded to their owners' success and social position. Animal-image inlays of bronze, gold, horn, or mother-of-pearl became popular. In Germany and Austria, craftsmen grew skilled not only at ornamentation but also in advancing the mechanics of the matchlock and its successors, the wheel lock and flintlock.

Through the 17th and 18th centuries, most sporting and hunting weapons, like most military guns, remained smoothbore, meaning the interior of the barrel was not "rifled" with spiral rifling grooves, and fired a solid lead ball. For hunting birds, rabbits, and other small game, sportsmen loaded their smoothbore guns with "shot," a small amount of

lead pellets that upon firing would spread into a cloud of pellets called "a pattern" that could bring down fast-moving prey of modest size.

In time, gunsmiths incorporated rifling, first introduced in the 15th century, which involved boring grooves on the inside of gun barrels. Originally the procedure had been designed to reduce powder residue from building up in the barrel. But 17th- and 18th-century gunmakers discovered that rifling offered another advantage: Parallel spiral grooves caused the ball, or bullet, to spin in flight, vastly improving accuracy. A fraction of rich European sportsmen paid to have their muskets rifled to improve hunting efficiency, and small, specialized army units also carried limited numbers of rifles. Still, the procedure was difficult and expensive to execute and rifling remained rare until the fabrication advances of the Industrial Revolution. ■



A miquelet lock, an early form of the flintlock created by the Spanish.



Gold stock inlaid with coral and silver.



A SOCIAL MEDIUM

During the Middle Ages, the hunt for food evolved into a social activity, guns included, for the upper classes. Aristocrats adopted a stylized version of hunting as a sport, viewing it an honorable use of their leisure time and a manly form of competition. Women, too, were invited along to shoot, and did so in all their finery.

But the shift to hunting as recreation for the wealthy also created social friction. Where the landed aristocracy claimed exclusive rights to feudal territory, they found themselves at odds with commoners who continued to hunt for subsistence purposes. The legendary outlaw Robin Hood acquired his heroic status, in part, for hunting “the King’s deer.”



◀ JEFFERSON'S MUSKET

Country: Tunisia

Date: 1789

Barrel Length: 84 in.

Caliber: .69

The Bey of Tunisia gave this musket to President Thomas Jefferson in 1805.

HUNTING AND SPORTING GUNS

From the 16th to 18th centuries, long guns spread across Europe.

Regional preferences were reflected in design features as well as style of firing mechanism. In Scotland, the snaphance was popular, while in Italian and German lands, gun-makers favored the wheel lock. For large game, some hunters opted for rifles, which were more powerful than smoothbore shotguns and fired a single, large-caliber bullet.



The buttstock was indented for fingers.

▼ SNAPHANCE GUN

Country: Scotland

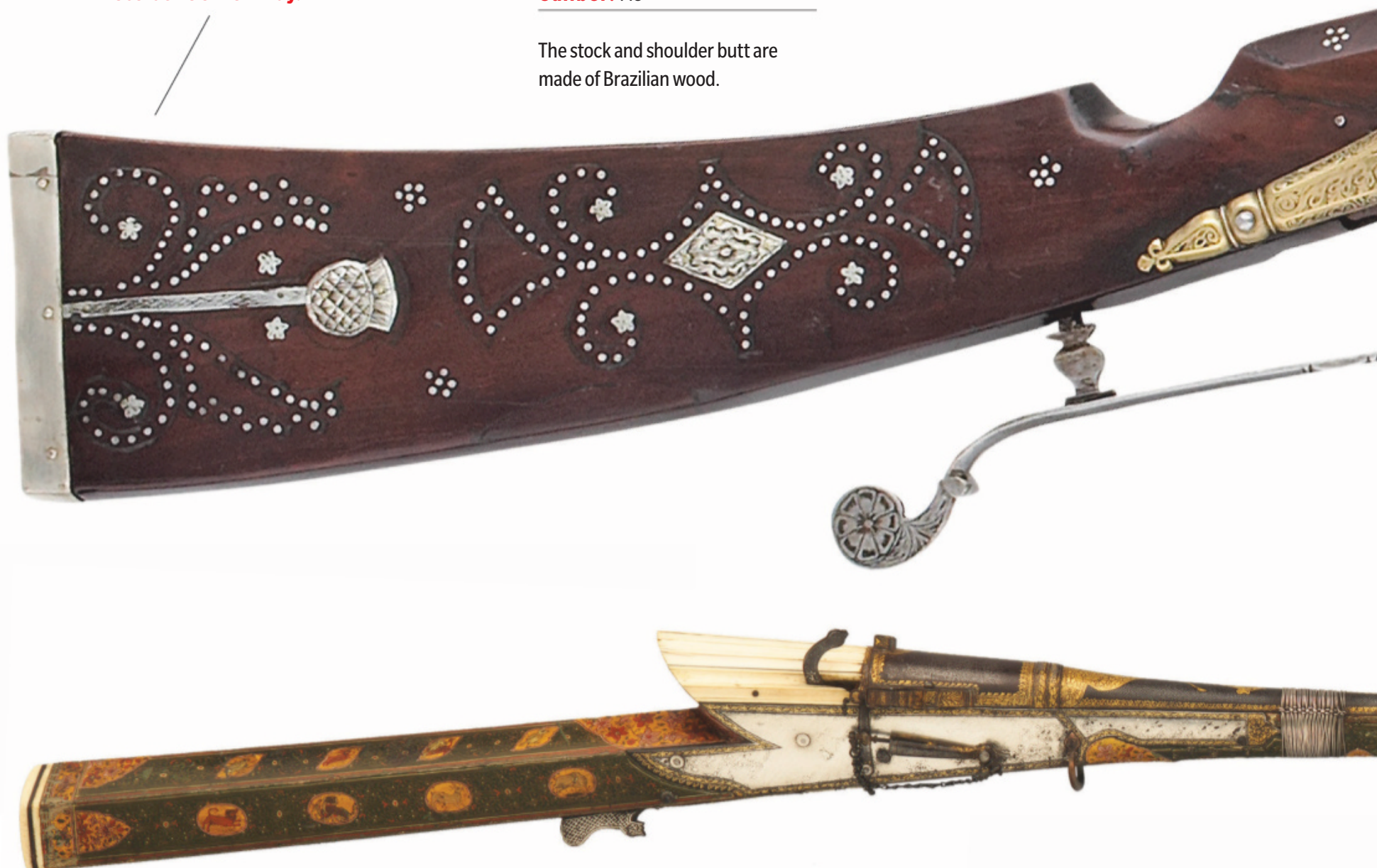
Date: 1614

Barrel Length: 38 in.

Caliber: .45

Decorative silver inlay.

The stock and shoulder butt are made of Brazilian wood.





FULL VIEW



▲ MATCHLOCK GUN

Country: Germany

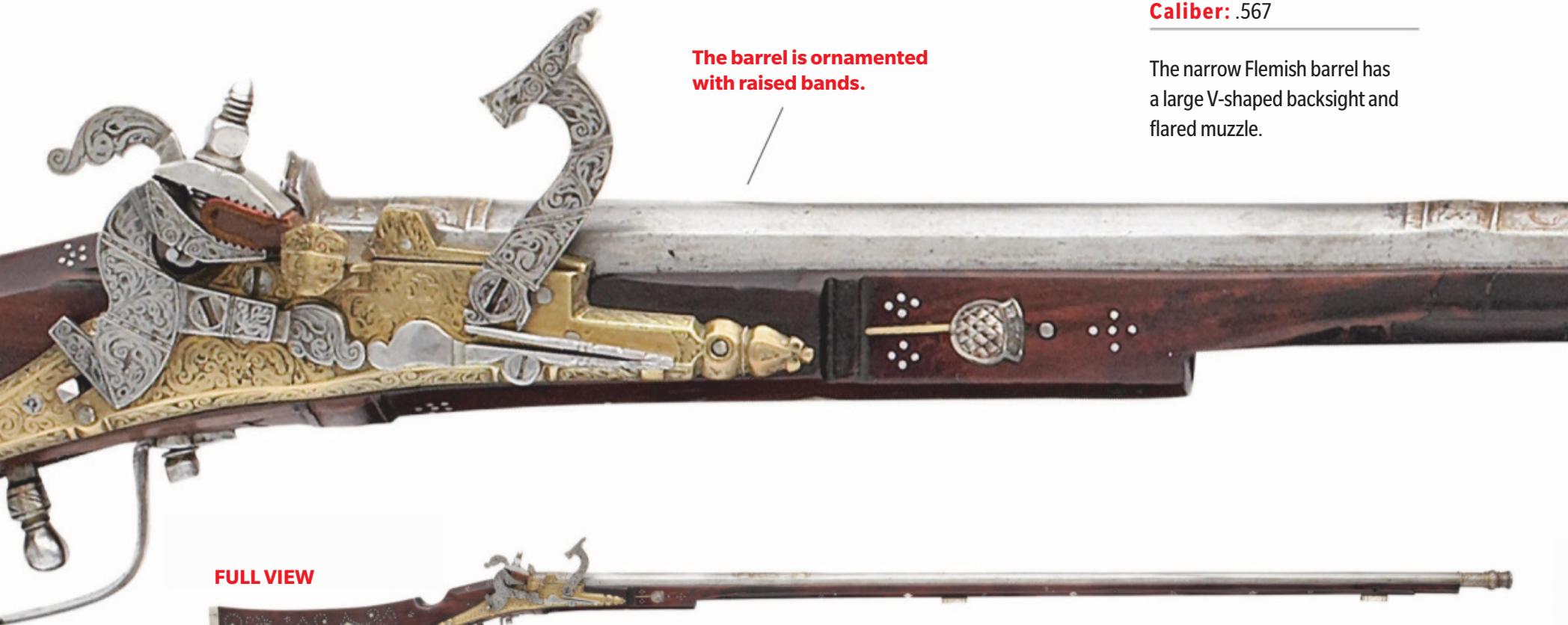
Date: 1621

Barrel Length: 48 in.

Caliber: .567

The narrow Flemish barrel has a large V-shaped backsight and flared muzzle.

The barrel is ornamented with raised bands.



FULL VIEW



▼ MATCHLOCK GUN

Country: India

Date: 17th century

Barrel Length: 41¾ in.

Caliber: .65

Weighing nearly 10 pounds, this steel-barrel gun is embellished with silver, gold, copper, and ivory.



3 | AN ERA OF EXPERIMENTATION

New technology laid the groundwork for modern pistols and revolvers and introduced fears about guns and crime.



During the Thirty Years' War among European powers, King Gustavus Adolphus of Sweden was killed in battle in 1632 by Catholic imperial forces using wheel-lock pistols.





FULL VIEW

A wheel-lock firing mechanism.



The trigger guard prevents accidental gun discharge.

▲ MARTIAL WHEEL-LOCK RIFLE

Country:	France
Date:	circa 1560
Barrel Length:	31 in.
Caliber:	.45

Wheel locks were used by France, Spain, and England in their colonies.



THE ARRIVAL OF THE WHEEL LOCK AND FLINTLOCK

New ignition-and-firing devices made guns more portable and paved the way for pistols and revolvers.

The 16th century marked an inflection point in the development of firearms, thanks to a new generation of ignition-and-firing devices and the introduction of smaller, easier-to-carry weapons.

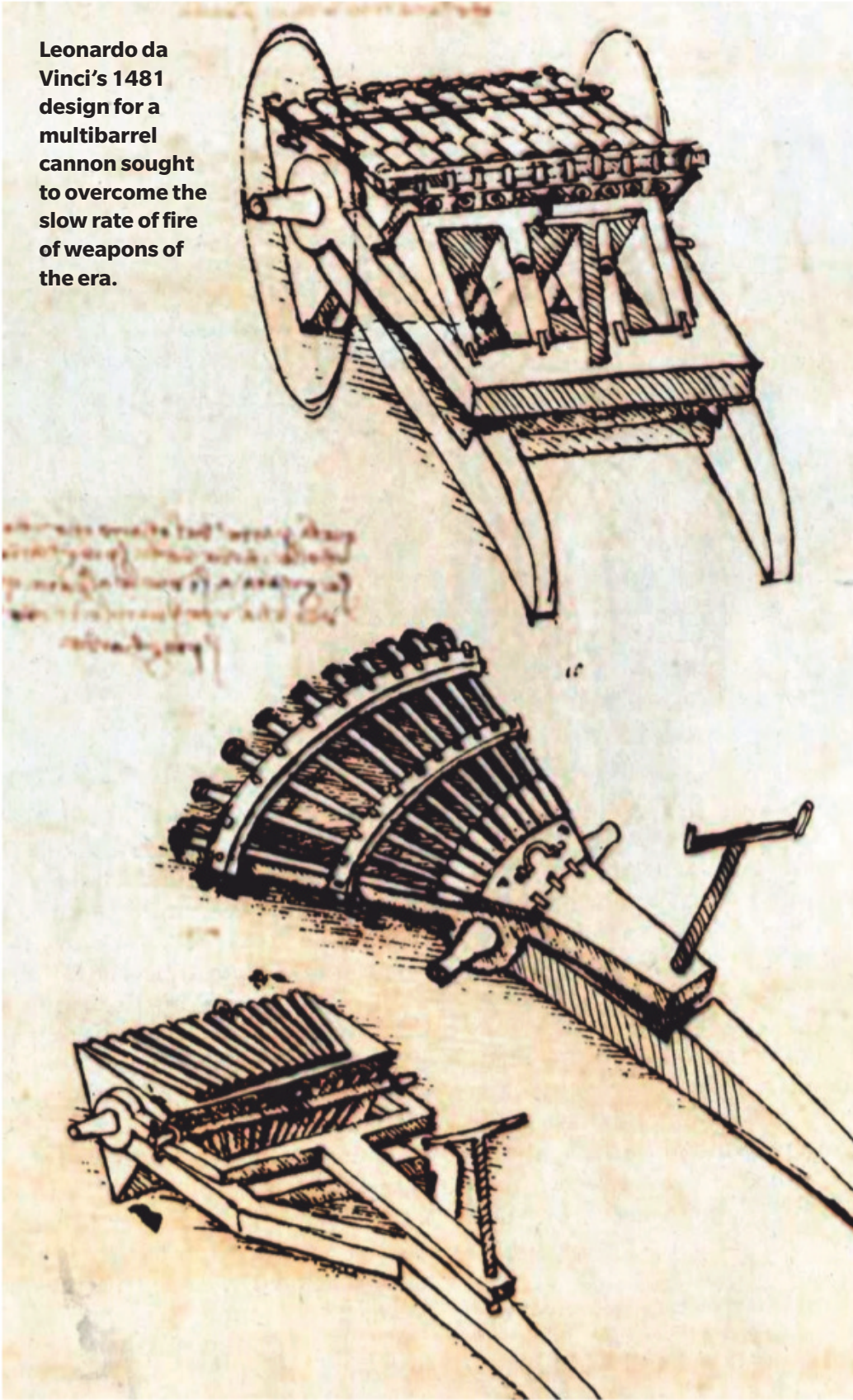
Until that time, the predominant lighting-and-shooting mechanism for muskets was the matchlock, which used a smoldering cord and

priming powder. The guns were sturdy and simple to operate but had limitations: The cord and powder were vulnerable to wind and rain, the burning cord alerted targets to the location of the gunman, and the complicated loading and firing process meant swift-moving cavalry couldn't rely on them. As the 1500s progressed, gunsmiths began experimenting with a new device, the wheel lock,

which ignited the powder internally without a match cord.

The change meant that less effort was required to load and conceal guns and that they were available to fire at a moment's notice. The new technology also laid the groundwork for modern handguns—pistols and revolvers—and introduced new fears about the use of guns in crime and political assassination.

Leonardo da Vinci's 1481 design for a multibarrel cannon sought to overcome the slow rate of fire of weapons of the era.



ARMS AND THE RENAISSANCE MAN

Leonardo da Vinci (1452–1519) recorded many ideas for improving weaponry, though it would be centuries before engineering technology would catch up with his vision. Field cannon of the era, for example, were difficult to reload, and there was a lag between blasts. Leonardo suggested a triple-barrel artillery piece in which each barrel would be loaded separately but all three would fire simultaneously. In the 20th century, designers included multibarrel weapons in warships, military airplanes, and rocket launchers.

Similarly, Leonardo's idea for an armored car—one that could move in any direction and bristled with powerful weaponry—anticipated the modern tank. Leonardo imagined his machine would be powered by eight men inside the car who would turn cranks to rotate the wheels. He also considered using horses to make his armored car move but dropped the idea because the animals would be difficult to control within the vehicle.



THE DA VINCI CODEX

Some scholars attribute the essential idea for the wheel lock to Leonardo da Vinci, the Renaissance polymath who kept detailed notebooks of his ideas and inventions. There are drawings of what looks like a wheel-lock device for a gun in Leonardo's *Codex Atlanticus*, a 12-volume work assembled in the 16th century that set out the inventor's ideas on astronomy, hydraulics, musical instruments, and more. Other historians trace the invention of the wheel lock to an anonymous German craftsman whose mechanism appeared in a volume published in 1505. The German hypothesis suggests that the "Löffelholz Drawings," a collection of designs of uncertain provenance, may contain ideas that predate those of Leonardo.

Whoever deserves credit—and in all likelihood it should be shared—



An Italian
wheel-lock
spanner,
circa 1630.

the earliest wheel locks seem to have been inspired by the clever notion of attaching a tinder lighter to the side of a musket to provide a means of igniting the gun's powder supply. (Imagine a rudimentary cigarette lighter or the utility lighter used to start a backyard grill.) The key components were a hammer-like piece known as the "dog" or "dog's head" that held a piece of iron pyrite and a spring-loaded steel wheel.

In preparation to fire, the shooter wound the wheel with a key, or "spanner," putting tension on the spring. When the trigger was pulled, the wheel released, struck the iron pyrite and generated a shower of sparks. The trigger pull simultaneously opened the pan holding the priming powder, which when lit sent a flash through a touchhole on the side of the gun barrel. When the

main powder charge in the breech ignited, gases were released that propelled the bullet.

The design evolution helped shift conflict on the battlefield. The new guns, albeit expensive to produce, were portable, which made it feasible to arm a cavalry unit. By the 1520s, designers were focusing on the wheel lock and creating smaller guns—pistols—that could be operated easily with one hand.

Since each wheel-lock weapon could be fired only once before requiring an elaborate reloading procedure, well-equipped cavalry members began to carry two pistols. Some also added a smaller, more manageable version of the musket known as a "carbine." So armed, a horseman could get off three shots in quick succession, making him a far more lethal threat than ever before. ■

AN EVOLUTIONARY ERA

As handguns became smaller, they played a larger role on the battlefield.

→ **1495** Leonardo da Vinci drew what may be the earliest sketches of a wheel-lock ignition device; the drawings were later collected in the *Codex Atlanticus*, a compilation of his sketches.



→ **1517** Fearing that the spread of wheel-lock pistols would lead to crime, Austrian emperor Maximilian I decreed what are thought to be among the earliest gun-control laws.

→ **1560s** The Northern European snaphance gunlock debuted. It was simpler and more reliable than the traditional wheel lock.



→ **1584** William, Prince of Orange, was assassinated with a flintlock pistol, underscoring how smaller, concealable weapons could enable crime.

→ **1632** Protestant King Gustavus Adolphus of Sweden was killed by Imperial Catholic forces using wheel-lock pistols during the Thirty Years' War among European powers.

WHEEL-LOCK LONG GUNS

With ornate decorations, these long guns saw only limited use as military weapons.

The wheel lock was an internal-ignition system that protected the gunpowder from weather conditions. A steel wheel rotated against a sliver of iron pyrite to produce sparks, which flashed through a touchhole to light the main gunpowder charge. Sixteenth- and 17th-century wheel-lock long guns, used primarily for hunting, had barrels that could exceed 40 inches, allowing the powder charge to burn completely and provide greater propulsion and accuracy. Most of these weapons were smoothbore muzzle-loaders.



▲ WHEEL-LOCK SPORTING GUN

Country: Germany

Date: circa 1620

Barrel Length: 46½ in.

Caliber: .50

FULL VIEW



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▲ TSCHINKE WHEEL-LOCK RIFLE

Country: Germany

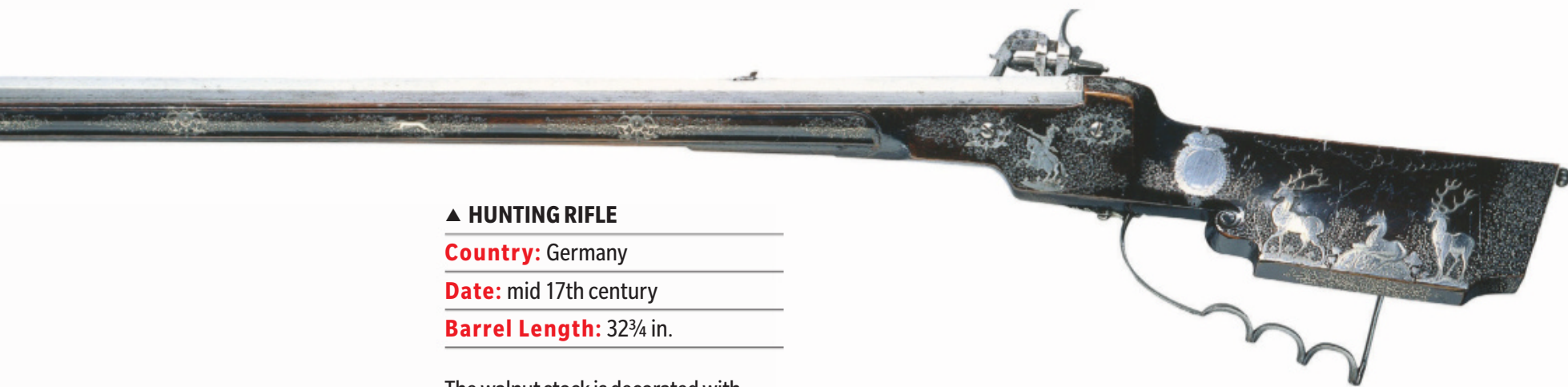
Date: circa 1630

Barrel Length: 37 in.

Caliber: .33

The lock on this rifle is distinguished by its external wheel and mainspring.

FULL VIEW



▲ HUNTING RIFLE

Country: Germany

Date: mid 17th century

Barrel Length: 32¾ in.

The walnut stock is decorated with inlaid silver wire and appliqué.

The stock is inlaid with silver birds and flowers.



FULL VIEW



THE FLINTLOCK REVOLUTION

European designers used a steel striking stone to create sparks and streamline gunmaking.

By the late 16th century, gunsmiths in northern Europe were devising improved methods of generating sparks to ignite priming powder. The main advance during the period involved using hardened steel against natural flint.

The first of these was the “snaphance,” or “snaphaunce” (from the Dutch word for “pecking bird”), which appeared in the 1560s. In this simpler and more reliable variation of a gunlock, the jaws of a spring-loaded “cock” holding a fragment of flint moved forward at

the pull of the trigger and struck a piece of steel, creating sparks that lit powder in the priming pan. If a shot was successful, the fire ignited the main powder load in the breech and the bullet was released. If the process failed and the bullet didn’t launch, it was



The L-shaped steel frizzen is part of the flintlock firing mechanism.

▼ **MODEL 1787 FLINTLOCK MUZZLE-LOADING CARBINE**

Country: Germany

Date: circa 1790

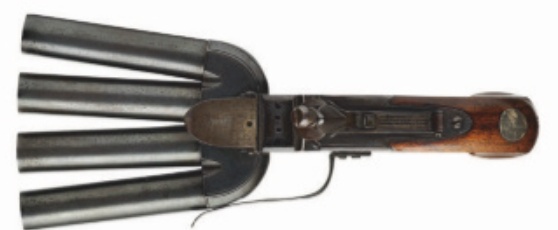
Barrel Length: 27 in.

labeled “a flash in the pan,” a phrase that later came to suggest noise or pyrotechnics with little or no lasting effect.

Seizing on the promise of flint, gunsmiths in France and elsewhere in Europe began to develop what would become known as the flintlock. In this streamlined design, the pan cover and steel-striking piece were combined into a single component and the overall number of gun parts were reduced to fewer than 20—half as many as the wheel lock. In time,

gunsmiths also moved the mechanical striking parts to the interior of the lock, where they were less exposed to the elements.

The flintlock coexisted for centuries with the more entrenched matchlock and wheel-lock guns. Early iterations can be seen in paintings of the 1620s by the Flemish Baroque artist Peter Paul Rubens, and flintlocks saw action during the English Civil War (1642–1651). They continued to catch on with military men and others, and by the 18th century,



BRITISH DUCK FOOT PISTOL

Flintlock devices were used well into the 18th century in combination with a variety of eccentric pistol designs, none more memorable than the “duck foot.” With four barrels, the weapon could fire a quartet of bullets simultaneously, if not necessarily accurately. Prison wardens and ship captains brandished the weapons to deter unruly prisoners or sailors. Only a limited number of duck-foot pistols were ever made, and those that remain have become prized collectors’ items.



▲ FLINTLOCK BLUNDERBUSS

Country: Great Britain

Date: 1755–1760

Barrel Length: 12½ in.

This muzzle-loading flintlock weighed 5 pounds, 13 ounces. The flared barrel opening was 1⅙ inches.

flintlock technology had been widely embraced.

The fact that the flintlock devices could be attached to almost any type of weapon and that they were moderately priced made them popular with Europeans and in European colonial territories. They also attracted interest from nonaristocrats: Hunters began to equip long guns with flintlock firing mechanisms, and duelists clashing over perceived slights used matched pairs of decorated flintlock pistols to settle scores.

While most flintlocks continued to be muzzle-loaded, by the 1700s some gunsmiths were making pistols that were loaded via the breech. The user unscrewed the barrel and inserted powder and ball at the breech, a process that sounds arduous but actually proved more efficient than the traditional use of a ramrod via the muzzle. A skilled gunman could fire several rounds in a minute with a breech-loading firearm.

DISTINCTIVE STYLES AND MODELS

During this era, the trade of gunsmith flourished, and craftsmen adorned weapons with ornamental carvings, silver mountings, engravings, and decorative inlays. By the late 18th century, sophisticated gunsmiths in Britain, the American colonies, and France had developed distinctive styles and models.

John Waters of Birmingham, for example, produced a famous blunderbuss pistol (from the Dutch *donderbus*, or “thunder gun”) that fired batches of shot, or small lead balls, from a flared muzzle. The wide mouth of the barrel allowed the shot to spread in flight, increasing the chances of hitting one or more targets. Below the brass barrel, Waters attached a spring-loaded blade that snapped out upon the pull of a secondary trigger. The miniature bayonet allowed the pistol user to close in for the kill if his initial shot didn’t finish the job.

Craftsmen with London’s Griffin & Tow made a pistol popular during the reign of Queen Anne (1665–1714) that had a tapered barrel and two triggers, one for each of the gun’s locks. A small version of the weapon was known as a “muff pistol,” suggesting that it could be concealed in the hand warmer of a lady who feared an attack, or perhaps who was planning to commit one herself. Queen Anne–style pistols remained popular in the United Kingdom for the rest of the 18th century.

In the American colonies, a Scottish immigrant named James Hunter produced the first colonial-manufactured military pistol at the Rappahannock Forge in Virginia. Hunter’s design imitated one used by the British Light Dragoons. The .69-caliber pistol had a nine-inch barrel and an elegant brass-capped pommel. Soldiers and sailors continued to use flintlock pistols, carbines, and muskets through the 1830s. ■



THE FLINTLOCK ASSASSIN

William I, Prince of Orange (1533–1584), was also known as William the Silent. He overcame his famous reticence to serve as leader of the Dutch revolt against the Spanish Hapsburgs. That rebellion in turn led to the formation of the Dutch Republic in 1648.

William met an untimely end at the hand of a Burgundian named Balthasar Gérard, who regarded the prince as a traitor

to King Philip II of Spain and to the Catholic Church. To execute his plot, Gérard engaged in an elaborate multiyear deception. After ingratiating himself with William, Gérard acquired a pair of flintlock pistols and shot his quarry dead in Delft in July 1584. Caught and imprisoned, Gérard met an even worse fate: live quartering and disembowelment, the removal of his heart, and separation of his head from his neck.

EARLY FLINTLOCK GUNS

Moving on from the wheel lock.

With early flintlocks, gunmakers streamlined traditional design, combining the pan cover and steel-striking piece into a single component and reducing the overall number of gun parts to fewer than 20—half as many as the wheel lock. The term “flintlock” refers both to the ignition mechanism itself and to any firearm that incorporates the mechanism into its design.



▲ FLINTLOCK REPEATING GUN

Country: Spain

Date: 1739

Barrel Length: 32¹/₅ in.

Caliber: .635



The fluted, hollow buttstock held a bayonet.



Scene of the 1830 Revolution, an oil painting by Philibert Rouvière (1805–65).





▼ FLINTLOCK FOWLING PIECE

Country: Spain

Date: circa 1790

Barrel Length: 42¼ in.

Caliber: .66



The barrel was supported with walnut stock.

▼ SHORT LAND MUSKET

Country: Great Britain

Date: circa 1785

Barrel Length: 41³/₁₀ in.

Caliber: .750



The standard weapon for British troops during the American Revolution.



A light-infantry model.

▼ FLINTLOCK OF KING FREDERICK WILLIAM II

Country: Prussia

Date: circa 1790

Barrel Length: 11½ in.

LATER FLINTLOCK GUNS

The flintlock remained in use for more than two centuries.

In the 17th and 18th centuries, the flintlock began replacing earlier firearm-ignition technology. Gunmakers produced the blunderbuss, flintlock long gun, and the smoothbore musket. The guns fired lead shot and were favored as defensive weapons by coachmen, innkeepers, and merchants.



A hinged buttstock trap was used for storage.



The Attack on the Wagon Train, a 1904 watercolor painting by Charles Marion Russell (1865–1926).





▲ **NAPOLEON BONAPARTE'S SPORTING GUN**

Country: France

Date: 1809

Barrel Length: 30 in.



A blackened barrel fitted with a break-off breech.

FULL VIEW



▲ **BAKER CAVALRY CARBINE**

Country: Great Britain

Date: circa 1827

Barrel Length: 19⁴/₅ in.

Caliber: .62

The Prince of Wales began supplying his regiment with the Baker carbine in 1803.



Made with Austrian and French parts.

▲ **FLINTLOCK MILITARY CARBINE**

Country: France

Date: 1815

Barrel Length: 32¹/₄ in.

Caliber: .71

This flintlock was likely used in Napoleon's Hundred Days campaign.

BLUNDERBUSSES AND CARBINES

These weapons were early versions of the shotgun.

The blunderbuss flintlock was muzzle-loaded with a large caliber to contain many balls or slugs. The gun was intended to be fired at short range. The flintlock carbine was usually smaller and lighter than a military musket. Some were intended for use by cavalry.



▲ FLINTLOCK MILITARY BLUNDERBUSS

Country: Great Britain

Date: circa 1781

The blunderbuss got its name from the Dutch term *donderbus*, meaning “thunder box” or “thunder gun.”



A breech open for loading.



▲ FLINTLOCK BREECH-LOADING CARBINE

Country: Great Britain

Date: circa 1810

Barrel Length: 20¹/₅ in.

Bore: .66

Breech-loading guns reduced reloading time by eliminating the need to push powder and projectiles down the barrel.



A three-sided bayonet.



▲ FLINTLOCK BLUNDERBUSS

Country: Great Britain

Date: circa 1790

Barrel Length: 13⁷/₁₀ in.

This brass-barrel blunderbuss features a top-mounted bayonet.



Painter Bogdan Willewalde (1818–1903) depicted the 1805 Battle of Austerlitz, one of Napoleon's greatest triumphs.

EUROPEAN FLINTLOCK HUNTING LONG GUNS

German, British, and Italian craftsmen were known for their engraving work.

By the start of the 18th century, designers were not only producing visually arresting guns but had developed flintlocks that could hit moving targets, including birds in flight, because the firing mechanism was faster.





▲ FLINTLOCK SPORTING GUN

Country: Germany

Date: 1646

Barrel Length: 44 in.

Bore: .39

The full stock of this hunting gun is lavishly inlaid with yellow-stained staghorn designs.

▼ FLINTLOCK SPORTING GUN

Country: France

Date: circa 1802

Barrel Length: 38 ¼ in.

Caliber: .638

Decorated with hunting scenes and the king's portrait, this silver-mounted flintlock was a gift to Spain's King Charles IV from the French government.



▲ FLINTLOCK SPORTING GUN

Country: France

Date: circa 1675

Barrel Length: 46½ in.

Caliber: .625

The Marquis de Croissy is said to have presented this exquisite firearm to the 7th Earl of Pembroke as a wedding gift in 1675.

FULL VIEW



4 | COMING TO AMERICA

When the Revolutionary War erupted, skilled marksmen armed with long rifles were able to hit British targets from 300 yards.



After British forces bayoneted American leader Hugh Mercer during the Battle of Princeton, General George Washington arrived to rally the troops. Painting by William Tylee Ranney, 1848.





MARKSMAN STYLE

The colonial militiamen who became soldiers in the Continental Army arrived for battle against the British in a variety of sartorial styles. For his forces, General George Washington favored the traditional hunting shirt popular in his home state of Virginia. A homespun garment, the hunting shirt was made from basic linen, fit loosely and allowed easy movement. In cold weather, better-equipped American soldiers also donned a wool overcoat. Washington noted an additional benefit: The hunting shirt, he observed, communicated “no small terror to the enemy, who think every such person is a complete marksman.”

THE NEW WORLD

Colonial gunsmiths adopted rifling, a technique from 15th-century Germany that improved a gun’s accuracy.

Images of the Pilgrims of the 17th century often show settlers with flintlock blunderbusses, but in all likelihood the early colonists brought with them more basic matchlocks, with perhaps the rare

wheel lock thrown in for variety. By the early 18th century, however, American gunsmiths, many of German descent, were producing flintlock weapons the colonists could call their own. Settlers used firearms for mili-

tary service and personal protection, and also for hunting, an important source of food and commercially valuable pelts in the heavily forested “New World.” Marksmanship became an important and honored skill.



One of the most notable American designs was the “long rifle,” also known as the Ohio, Pennsylvania, or Kentucky rifle, depending on where the rifleman resided. Derivative of the classic German Jäger rifle (“hunter rifle”), the American versions evolved to have longer barrels for greater accuracy and slender wooden stocks that extended the full length of the barrel. The rear of the stock, held against the shooter’s shoulder, had a gradual downward curve. Well-to-do colonists paid to

have their long rifles decorated with pewter or brass inlays depicting animals or shapes such as hearts or stars.

As the designation “rifle” indicates, American gunsmiths sought enhanced accuracy by making the transition from smoothbore weapons to “rifled” long guns. In a smoothbore weapon, the ball fit loosely in the barrel. Once propelled by exploding gases, the round careered down the barrel, banging from side to side and emerging at an unpredictable angle from the muzzle. This effect made early pistols and muskets notoriously inaccurate.

Carving spiral grooves into the interior of the barrel, or rifling, caused the ball to spin gyroscopically, which kept it on a straight course over a far longer distance. German gunsmiths invented the technique back in the late 15th century, but because of the expense of precision metalworking and the talent required to do it well, rifles remained

▼ KENTUCKY LONG RIFLE

Country: United States

Date: 1800s–1900s

Barrel Length: 39 in.

Caliber: .45

An engraved silver patch box.



Made by John Palm of Pennsylvania.

FULL VIEW

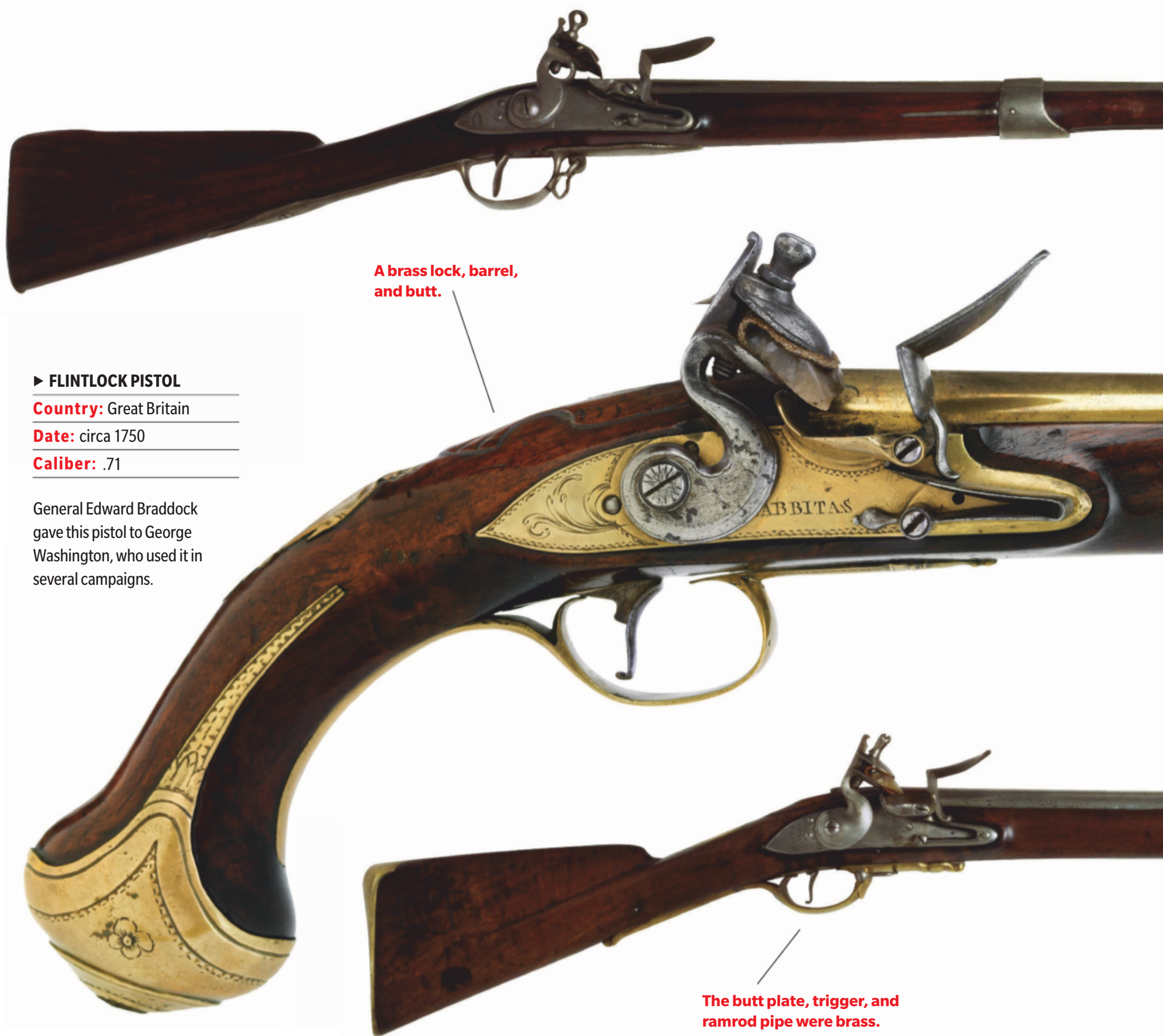


relatively rare. There were other downsides as well: Rifles were more susceptible to clogging because of powder residue, and tighter-fitting rifle balls were more difficult to load into weapons that for the most part were still muzzle-loaders.

PANIC AMONG THE REDCOATS

When the Revolutionary War erupted in 1776, American forces included snipers and light infantry equipped with long rifles. Skilled marksmen in specialized units could hit British targets at a range of 300 yards, compared with less than a third of that distance with a smoothbore musket. The ability of riflemen to target and kill British officers helped the Revolutionary forces disrupt their foes’ command structure and spread panic among the redcoats.

But American soldiers with rifles still needed protection from larger infantry units armed with smooth-



► FLINTLOCK PISTOL

Country: Great Britain

Date: circa 1750

Caliber: .71

General Edward Braddock gave this pistol to George Washington, who used it in several campaigns.

bore muskets that were easier to operate. The Brown Bess, a British musket imported to the colonies and later copied in the breakaway states, became a common weapon on the Revolutionary side. It could be loaded with a single ball or a cluster of shot. The Short Land Pattern version of the Brown Bess was, as the name implied, a shorter, lighter variation of the more common Long Land Pattern.

Bayonets remained vital firearm

accoutrements throughout the Revolutionary War, since the musket's inaccuracy meant that many battles were decided by means of massive charges and hand-to-hand struggles to the death. Because of the absence of effective medicine, a tearing flesh wound rendered by bayonet was actually just as likely to be lethal as a puncture wound by small lead ball.

General George Washington, interestingly, focused on the rifle's

drawbacks: the expense of manufacture, the slow reloading process, and the need to do extensive training for recruits not already skilled in hunting. While Washington urged limited use of rifle companies, other Revolutionary leaders showed more enthusiasm and scraped together the resources to outfit sharpshooting units that played significant roles in the battles of Saratoga and New Orleans. ■



▲ MUSKET

Country: France

Date: circa 1779

Caliber: .69



▼ BRITISH SHORT LAND SERVICE MUSKET

Country: Great Britain

Date: circa 1779

Nicknamed the "Brown Bess," this long gun was used by the British Empire's land forces until the mid 19th century.



The Brown Bess weighed about 10 pounds.

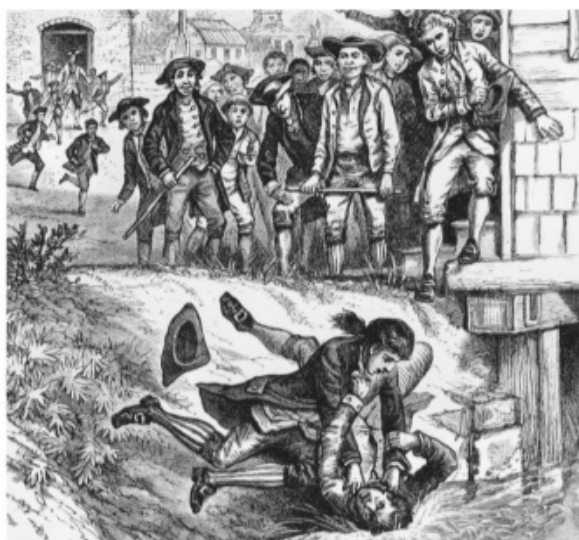


CLUBBING THE ENEMY

During the 1600s and for centuries thereafter, troops generally fired their muskets in massive volleys similar to the waves of arrows launched by archers. Given the difficulty of aiming at a far-off target, musket men typically did not pause to reload, but instead followed a volley by charging at the enemy with bayonets. Infantry units generally did more lethal damage in hand-to-hand combat, stabbing and clubbing the enemy, than they did by firing their guns.

SPRINGFIELD: ARMORY FOR A NEW NATION

1787 During a short-lived antitax and antidebt rebellion, former Revolutionary soldier Daniel Shays and his renegade forces tried to capture the armory but were repelled by Massachusetts government forces.



1812 The Springfield Armory produced muskets used by U.S. troops in the War of 1812 against Great Britain, a conflict sometimes referred to as a “second war of independence.”



1845 After visiting the amory during his honeymoon, Henry Wadsworth Longfellow published “The Arsenal at Springfield,” a poem that referenced racks of muskets as an antiwar metaphor.



1750

1800

1850



1795 Manufacture of firearms at the Springfield Armory began; it continued through the late 1960s.



1861–1865 The Springfield Model 1861, a Minié-type rifled musket, was used by Union forces and the Confederate States of America during the Civil War. It weighed about nine pounds and was favored for its accuracy, reliability, and range.

Beginning in the 17th century, colonial militia conducted training exercises on a bluff near the Connecticut River in Massachusetts. After the American Revolution began, military officer Henry Knox and George Washington established an armory on the site, in 1777, and it was used to supply forces in upstate New York.

1866–1871 Following the Civil War, the armory received permission to create an on-site collection of weapons that could be used by staff engineers for reference during the research and development process. In 1871, the collection opened to the public as a museum.



1962 The armory was designated a National Historic Landmark in 1962, then in 1964, U.S. Secretary of Defense Robert McNamara announced the armory would be closing. It shuttered its doors in 1968, with the National Park Service taking stewardship of the site and museum collection in 1978.

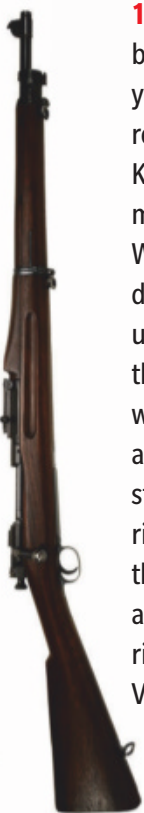


1900

1950

2000

1900 The armory began a three-year process of replacing the Krag-Jørgensen magazine rifle. Work on the design continued until 1903, when the Model 1903 was officially approved. It was a standard military rifle for more than three decades and a special-use rifle through the Vietnam War.



1919 John Garand was hired to head the Model Shop and work on semiautomatic rifles and other small projects. The final design for the M1 was adopted in the mid 1930s, and the gun was embraced by the U.S. military. By the end of World War II, the armory had produced 3.5 million semiautomatic Garands.

AN ARMORY'S LEGACY

An amazing innovation started with a copy of a French flintlock musket.

Originally an arsenal for the Continental Army, the Springfield Armory became a full-fledged factory in 1795 on the order of President George Washington. His directive: Produce flintlock muskets for his young nation. A year later, the armory issued a copy of a French Charville flintlock musket, and over the next two centuries it continued with innovations that spanned gunmaking and industrial production. Probably the most famous rifle ever produced by the armory was the M1 Garand.

Springfield's first weapon was a French-style flintlock.



It became standard issue for U.S. infantrymen in World War I.



▲ MODEL 1903 RIFLE

Country: United States

Date: 1903–1974

Barrel Length: 24 in.

Caliber: .30

Over 1 million were made through World War I and into the 1930s.

▼ M1 GARAND

Country: United States

Date: 1937–1950s

Barrel Length: 24 in.

Caliber: .30

More than 13,500 employees worked 24 hours a day during World War II to produce this semiautomatic.





▲ **MODEL 1795**

Country: United States

Date: 1795–1845

Barrel Length: 44 ½ in.

Caliber: .69

It used the Minié ball for ammunition.



◀ **MODEL 1861 RIFLE MUSKET**

Country: United States

Date: 1862

Barrel Length: 40 in.

Caliber: .58

The model featured a percussion ignition system and a rifled bore.



The Model 1903 was developed to surpass the first bolt-action rifle used by the U.S. Army.



▲ **M14**

Country: United States

Date: 1957

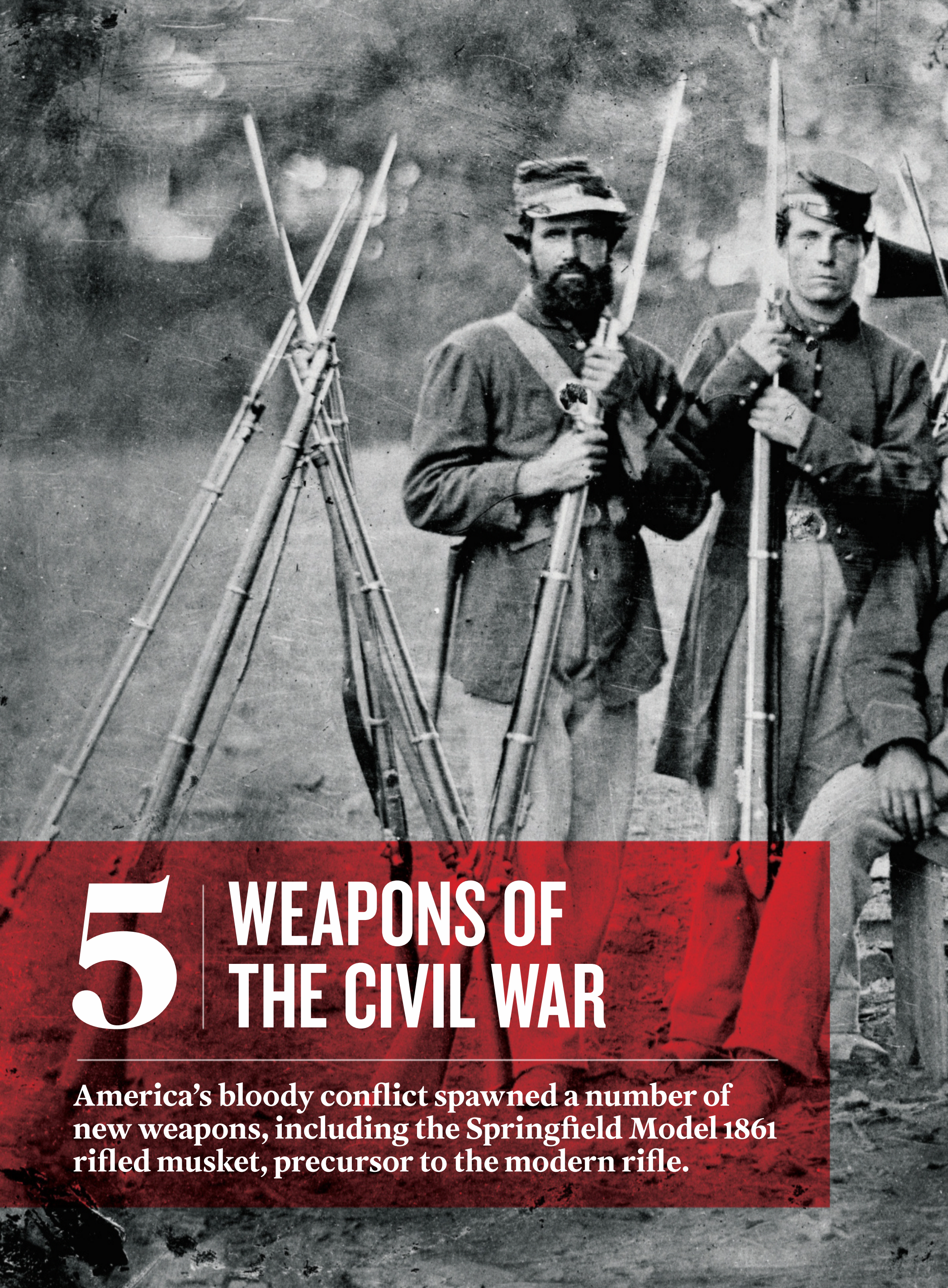
Barrel Length: 22 in.

Caliber: .30

A descendant of the M1 Garand.



The rate of fire was superior to the slower Mauser used by German forces.



5 | WEAPONS OF THE CIVIL WAR

America's bloody conflict spawned a number of new weapons, including the Springfield Model 1861 rifled musket, precursor to the modern rifle.



In 1861, after the Civil War began, Union soldiers posed with bayoneted Springfields.



▲ 1861 MODEL SPRINGFIELD RIFLE-MUSKET

Country: United States

Date: 1862

Barrel Length: 40 in.

Caliber: .58

Made at the Springfield Armory in Massachusetts, this percussion weapon was widely used throughout the Civil War. The Springfield pictured above was test-fired but never issued.

A NEW COURSE FOR WEAPONRY

Federal arsenals were able to produce better long guns and revolvers in far greater volume than facilities in the lightly industrialized South.

The American Civil War inspired advances in firearms that in turn redefined armed conflict and reshaped American society. Referred to as the first truly “modern war” because of its brutal tactics and industrial-scale carnage, the clash between North and South saw the introduction and initial widespread use of breech-loading infantry firearms, repeating rifles, and rudimentary rapid-fire guns. Though disease and infection were the war’s most insidious killers, more-effective weapons also contributed to a combined death toll of some 700,000—more fatalities than in all other American wars combined. Firearm innovations associated with the Civil War set patterns that continued during the late-19th-century westward expansion of European-descended American settlers and contributed to the slaughter

of indigenous Native Americans.

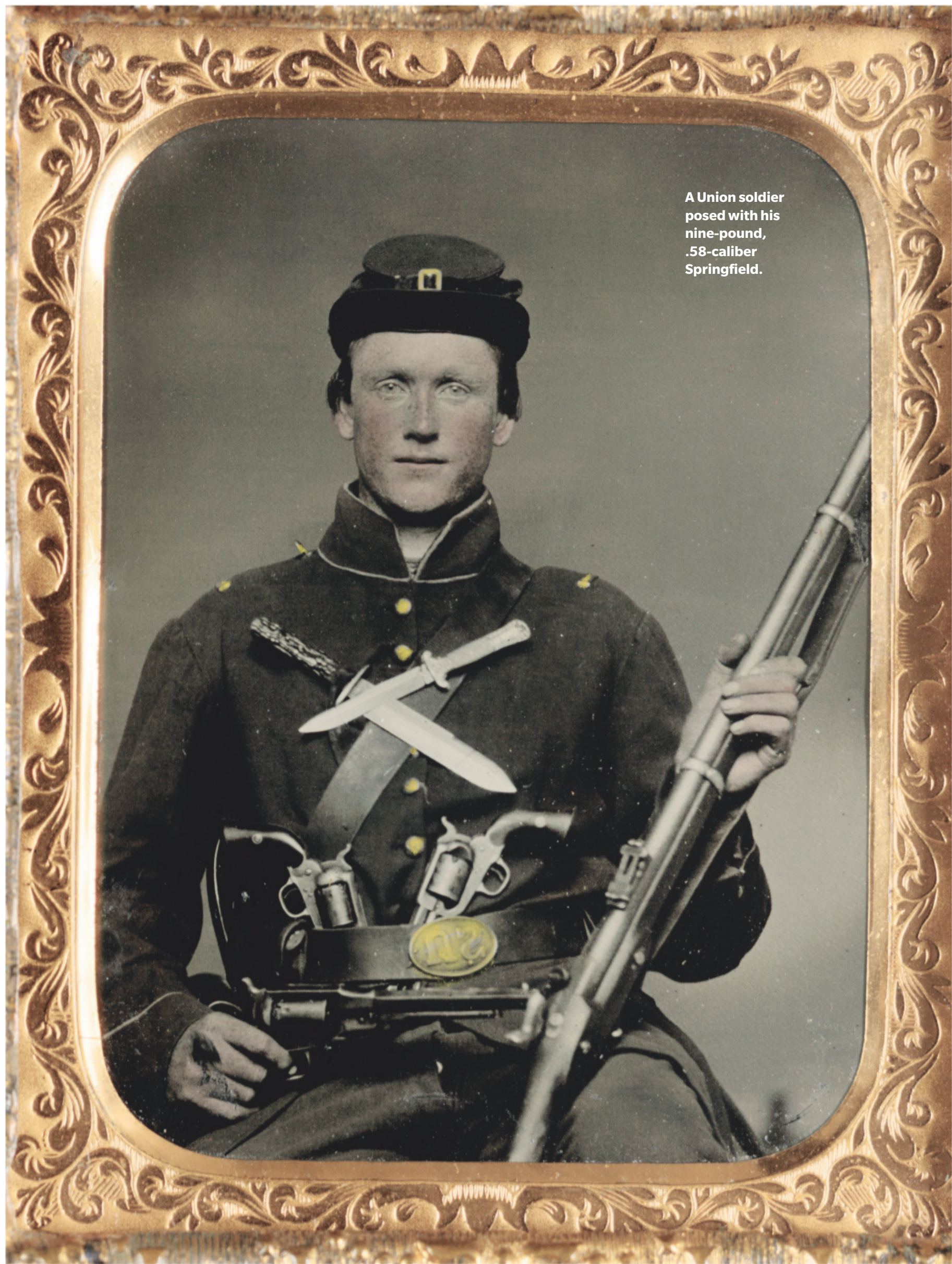
The Union and Confederacy both entered the war unprepared to arm massive military operations, but the North rapidly gained a devastating advantage by using its superior industrial resources to produce weapons. Northern government arsenals, such as the one in Springfield, Massachusetts, and numerous other factories in New England, turned out long guns and revolvers of better quality—and in far greater volumes—than facilities in the lightly industrialized South.

More-effective weapons contributed to a combined death toll of some 700,000.

THE UNION’S ADVANTAGE

Still, it took a while for the North to gear up. In the first years of the war, many Union troops went into battle with antiquated .69-caliber flintlock muskets. Gradually, many of these old long guns were overhauled with percussion-cap firing systems. The North gained a distinct lead in the arms race when the Springfield Armory began churning out the Springfield Model 1861 rifled musket, a reliable weapon that came as close as any to serving as a standard-issue firearm for Union forces. Smaller factories and workshops across the North also made the Springfield 1861 under license arrangements.

Equipped with a bayonet, the Springfield weighed more than nine pounds and measured 58 inches, about the height of a typical soldier of the era. Although unwieldy by modern standards because of its



A Union soldier posed with his nine-pound, .58-caliber Springfield.

► **REMINGTON
NEW ARMY MODEL**

Country: United States

Date: circa 1864

Length: 13¾ in.

Caliber: .44

This six-shot revolver debuted about two years after the Colt 1860 Army. The Colt, which had early military contracts, dominated sales.



A forged steel barrel.

size, the rifled Springfield musket proved far more accurate than its smoothbore predecessors. It fired a lead bullet, typically .58 caliber, and had an effective range of 200 yards. In recognition that even men of ordinary skill could actually aim the Springfield and hope to hit their target at some distance, Northern manufacturers began adding rear sights to Springfields, which further improved accuracy.

Union quartermasters issued ammunition that made the standard Springfield 1861 more deadly. Known as the Minié ball after its French inventor, Claude Minié, the heavy

bullet expanded as it traveled down the barrel, resulting in a tighter fit in the rifle grooves and more rotation. Swifter rotation translated to steadier flight and greater precision.

All of these improvements made infantry units, even those manned by raw recruits, far more capable of inflicting death and destruction. Rather than charging across open fields, riflemen could establish defensive positions behind natural or man-made cover, firing several rounds a minute with far more effect. Commanders on both sides, however, were slow to absorb the potential advantage of “digging in” defensively,

and that led to many battles, particularly during the first half of the Civil War, in which unwitting soldiers charged in large numbers only to be mowed down by increasingly accurate rifle fire.

The Union enjoyed a further edge by exploiting the next generation of long guns: breech-loading and repeating rifles and carbines designed by gunsmiths such as Benjamin Henry, Christian Sharps, and Christopher Spencer. Rather than stuffing ammunition down the barrel, an awkward, centuries-old procedure, a soldier with a breech loader inserted his bullet into a chamber that was



This octagonal barrel had a loading lever that compressed the bullet and powder into each of the cylinder's chambers.



Spencer's new design included a tubular magazine in the buttstock, which held seven rounds.

▼ SPENCER LEVER ACTION CARBINE

Country: United States

Date: mid 1860s

Barrel Length: 22 in.

Caliber: .52

John Wilkes Booth was captured and killed with a seven-shot Spencer carbine in his hand.

part of the rear portion of the barrel. Breech-loading weapons were particularly useful to cavalymen who struggled with old-fashioned muzzle-loaders.

The Spencer carbine, introduced in 1860, featured both breech-loading and repeat firing. The rifle came equipped with a tubular "magazine," or ammunition container, located in its stock, which could hold seven .56-caliber copper-jacketed cartridges. The Spencer was the first repeat-fire carbine to be officially adopted by a major army; the Union bought more than 100,000, which were mostly issued to

elite infantry and cavalry units.

With the advent of more accurate rifles and carbines, long-distance sniping became a more common tactic. Both sides in the conflict formed specialized platoons of marksmen, the best known of which was Berdan's Sharpshooters, a Union outfit named for its commander, Hiram Berdan. The term "sharpshooter" may well have referred to the particular gun that many of Berdan's men carried: a breech-loading rifle designed by Christian Sharps, who began his career in the 1830s at the Harpers Ferry Arsenal in what's now West Virginia. ■



OFFICER CLAUDE-ETIENNE MINIE: DESIGNING A BETTER BULLET

Officer Claude-Etienne Minié (1804–1879) fought for France in colonial campaigns in Africa before turning his attention in the late 1840s to designing a bullet that later became known as the Minié ball.

Fired from a rifled barrel, Minié's cylindrical projectile had a conical point and resulted in noticeably improved accuracy. It featured an iron cup inserted in the hollow base of the bullet; when fired, the cup moved forward, expanding the base for a snug fit against the grooves of the rifling. In recognition of Minié's contribution, the French government awarded the officer a generous bonus and a position at the prestigious Vincennes military academy. He retired from the French army in 1858 with the rank of colonel and later served as a military adviser in Egypt and migrated to the United States, where he worked in a supervisory capacity at the Remington Arms Company.

GUNS OF THE NORTH

In the first years of the war, some Union forces carried old flintlock muskets.

Though the North was more heavily industrialized than the South, Union soldiers were still forced to scramble to find guns for battle. Some brought their own long guns from home, but in time, the Springfield Armory began creating the Model 1861 rifled musket, and other small weaponmakers stepped up to produce the gun under a license arrangement.



Federal and state governments hired Colt to make more than 100,000 Model 1861 muskets.



Designed with a brass trigger guard, patch box, and butt plate.



A six-shot cylinder.

▲ ALFRED P. JENKS & SON MODEL 1861 PERCUSSION RIFLED MUSKET

Country: United States

Date: 1861

Length: 40 in.

Caliber: .58



▲ REMINGTON-BEALS NAVY

Country: United States

Date: 1861–1863

Barrel Length: 7 ½ in.

Caliber: .36

This was Remington's first military revolver.



▲ **COLT MODEL 1861
RIFLED MUSKET**

Country: United States

Date: 1865

Barrel Length: 40 in.

Caliber: .58

▼ **HARPERS FERRY MODEL 1841**

Country: United States

Date: circa 1841

Barrel Length: 33 in.

Caliber: .54

Dubbed the “Mississippi rifle,” for the U.S. regiment that prevailed in the Mexican-American War.



Alfred Jenks was one of 21 U.S. contractors making weapons for the North.



**BENJAMIN TYLER HENRY:
REPEAT PERFORMANCE**

Benjamin Tyler Henry (1821–1898) invented the first reliable lever-action repeating rifle, widely known as the Henry rifle, and worked for several legendary figures in the 19th-century firearms industry.

In the 1850s, he helped design a rifle called the Volitional Repeater for entrepreneurs Horace Smith and Daniel Wesson of Smith & Wesson fame. He also worked for Oliver Winchester.

As the years passed, Henry became a respected designer in his own right and in 1860 obtained a patent on a .44-caliber breech-loading repeating rifle that saw

action during the Civil War alongside the more prevalent muzzle-loading Springfield Model 1861. Later in the war, Henry and Winchester clashed over Henry’s pay and the amount of recognition he received for his design work. Frustrated, Henry quit the Winchester Repeating Arms Company and was eclipsed by its owner, who had Henry’s design overhauled and renamed the Winchester Model 1866. The .44-caliber Winchester 66 became one of the most widely used guns in the American West during the last third of the 19th century.



The tubular magazine held 15 rounds that cycled by opening and closing a special lever in the trigger guard.

HIRAM BERDAN: MARKSMAN AND LEADER

An inventor recruited elite Union soldiers to join the sharpshooters.

Hiram Berdan (1823–1893), a New York engineer and inventor, was a renowned marksman and guiding force behind the U.S. Volunteer Sharpshooter Regiments during the Civil War. He was the inventor of the Berdan repeating rifle, the Berdan centerfire primer, and numerous other weapons and accessories.

Recruits in Colonel Berdan's units had to pass marksmanship tests, wore distinctive green uniforms, and carried repeating rifles and carbines designed by Christian Sharps. The men were frequently deployed to skirmish and harass Confederate forces from a distance, and they fought at some of the most important battles of the war, including the Second Battle of Bull Run, Shepherdstown, and Chancellorsville. At the Battle of Gettysburg, Berdan's Sharpshooters helped slow Confederate assaults on Devil's Den and the Peach Orchard. After the war, Berdan returned to military inventing, and his creations included a submarine gunboat and a torpedo boat. ■

New York sharpshooter Hiram Berdan scoured the Northern states to find proven marksmen who specialized in scouting, skirmishing, and sniping.





1ST REGIMENT

BERDAN'S U. S. SHARPSHOOTERS!

Lieut. Winthrop, de-
tailed from Washington to recruit for
this Regiment will

"SHOOT IN"

all who may apply, this day, in the
field in rear of residence of S. Arnold
Esq.

Shooting to commence at 8 o'clock,
A. M. and at 2 o'clock, P. M.
Saturday, 26, Oct., 1861.

A Berdan recruit cradles his
Sharps rifle. Touted as
"superior to any other arm
in the service," it cost \$45,
nearly four times as much as
the Army-issue Springfield.



The 1859 breech-loading
.52 Sharps could fire up to
10 rounds a minute.

CHRISTIAN SHARPS: AIM HIGH

As a boy, Christian Sharps (1810–1874) apprenticed to a New Jersey gunsmith and in the 1830s worked as a laborer at the Harpers Ferry Arsenal in Virginia. Not content to be a hired hand, Sharps taught himself about breech-loading rifle designs and became an expert on the use of interchangeable parts. By the 1840s, he had refined what became known as the Sharps rifle, a gun renowned for its long-range accuracy, and received a U.S. patent for it in 1848.

Sharps' Model 1849 became the first breech-loading rifle to gain wide acceptance. A smaller, lighter carbine version was especially popular with the Union Army. Jealous of the rapid, accurate firing capacity of the Sharps carbine, the South tried to reverse-engineer the gun, but Confederate knockoffs functioned poorly. After the war, Sharps continued designing firearms and launched a trout-farming business in Connecticut before dying of tuberculosis in 1874.

CHRISTOPHER SPENCER: WEAPON ENTREPRENEUR

Born in Connecticut, Christopher Spencer (1833–1922) learned about making guns in Samuel Colt’s Hartford factory. He went on to invent a repeating rifle that bore his name and was one of the first lever-action long guns widely used in the United States.

Like so many other weapon entrepreneurs of the era, Spencer struggled at first as a businessman. Hoping to get a contract to produce rifles for the Union, he embarked on an audacious lobbying effort. Striding into the wartime White House one day in August 1863, Spencer made his way past sentries and gained access to the office of President Abraham Lincoln. This led to a subsequent meeting during which Spencer and Lincoln, joined by Secretary of War Edwin Stanton, tested Spencer’s creation. The presidential party relocated to the nearby National Mall, where Lincoln personally fired the rifle and declared it worthy.

The Union began ordering Spencer rifles and carbines, and none other than General Ulysses S. Grant declared them “the best breech-loading arms available.” After the war, many veterans kept their rifles, and Spencer arms became popular among Western settlers. The proliferation of military surplus dampened sales for the Spencer Repeating Rifle Company, however, and it slipped into insolvency in 1868. The following year, its assets were acquired by another prominent figure in the gun trade, Oliver Winchester.





Spencer reentered the arms business in Windsor, Connecticut, in the 1880s. His workers produced slide-action repeating rifles.

FULL VIEW



A tubular magazine in the butt held seven rim-fire cartridges.

▲ **SPENCER MODEL 1860 RIFLE**

Country: United States

Date: 1863

Barrel Length: 30 in.

Caliber: .52

The Spencer rifle and carbine were both highly valued on the battlefield.



ARMING A BREAKAWAY NATION

Until the Union Navy's blockades cut supply lines from Europe, the South imported arms from such sources as England and Austria.

In an imbalance that played an important role in the war's outcome, the Confederacy lacked the workshops and factories that powered the Union Army. The South scrambled to arm itself creatively—by building knockoffs of successful guns used by the North or scavenging them from battlefields. In 1861, for example, Confederate forces captured the federal arsenal

at Harpers Ferry in what was then Virginia. That raid yielded an immediate boon—the armory's store of rifles—and also a trove of tools and machinery that Southern military officials used to establish smaller factories elsewhere.

The secessionist states also turned to Europe for help. Though the British government officially maintained neutrality and the Royal

Arsenal at Enfield was not permitted to supply the Confederacy, small private factories were eager for the business and sold the Confederacy hundreds of thousands of Enfield .577-caliber rifled muskets. Austria, too, provided arms, selling a limited number of Model 1854 Infanteriegewehr, or infantry rifles.

Yet the South never came anywhere close to matching the



◀ LEMAT REVOLVER

Country: France

Date: circa 1860

This 14-inch revolver stacked two barrels: The top fired nine .42-caliber bullets; the bottom .63-caliber barrel threw buckshot.

▼ LORENZ MUSKET

Country: Austria

Date: 1854

Barrel Length: 37½ in.

Caliber: .54

This musket, used by Southern and Northern troops, was carved from one piece of wood.

▲ ENFIELD RIFLED MUSKET

Country: Great Britain

Date: 1853

Length: 55 ½ in.

Caliber: .577

The 1853 rifled Enfield and the U.S. Springfield could use the same ammunition. Union troops also relied on this musket.



A muzzle-loading barrel.

manufacturing capacity of the North, and the guns it did make were often inferior. When makers tried to imitate breech-loading Union weapons like the Sharps carbine, their mechanically inferior version, called the “Richmond Sharps,” failed frequently in battle. Confederate general Robert E. Lee disparaged the gun as “so defective as to be demoralizing to our men.” The South was further disadvantaged in the arms race once Union blockades of Southern ports cut supply lines from Europe.

In early-model guns, shooters measured out the right amount of powder propellant and placed it in the barrel along with a bullet (known as a ball) and some wadding

to secure the powder and projectile in place and put a percussion cap on the nipple for the hammer to strike. This system was referred to as cap-and-ball, and was used in the first revolvers designed by Colt in the 1830s. The new revolvers had the advantage of allowing shooters to fire off a succession of five or six shots but still required the gunman to laboriously reload each chamber with loose powder and a lead bullet and then place a percussion cap on the nipple of each chamber.

At about the same time, European gunsmiths were developing a more efficient shooting system that relied on self-contained paper cartridges with a metal base that contained primer, powder, and bullet in one

unit. By 1846, Benjamin Houllier of Paris had created a cartridge pressed from copper or brass—all metal and a single piece. In 1860, the American Benjamin Tyler Henry improved on the same basic design by adding a hollow rim that contained the chemical primer. Such “rim fire” cartridges tended to be delicate and subject to accidental discharge. Still, rim-fire ammunition enabled repeating weapons, such as the Spencer rifle, to fire a dozen rounds in a minute. Hiram Berdan later developed a one-piece brass case that contained primer in a percussion cap at the center of the cartridge’s base, a more stable and reliable design that became standard for weapons of all sorts. ■



As Union forces approached Richmond, Virginia, Confederate soldiers were ordered to torch anything of military value, including the state armory.

SOUTHERN INDUSTRY

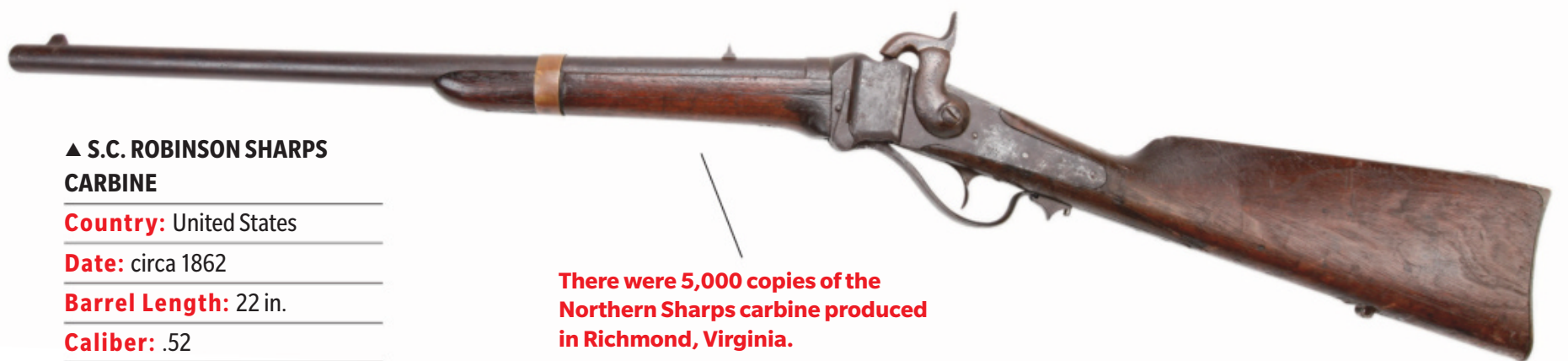
Factories opened across the Confederacy as makers Sought to catch up with their Northern foes.

A largely agrarian society, the American South suffered a terrible disadvantage when it came to arms manufacturing. Southern gun-making operations were small and inefficient compared with their Northern rivals. In New Orleans, for example, Ferdinand W.C. Cook and

his brother, Francis, both English citizens, opened a rifle factory on Canal Street in June 1861. They initially supplied Alabama militias and then won a substantial contract from the Confederacy for 30,000 arms. But the fall of New Orleans in 1862 forced them to relocate to Athens, Georgia. The state of Tennessee operated

armories at Columbia, Memphis, Nashville, Gallatin, and Pulaski that converted flintlock muskets to percussion-cap weapons. The Pulaski and Gallatin facilities made new carbines and rifles.

In Memphis, Leech & Rigdon, also known as Memphis Novelty Works, made imitation Colt revolvers of



▲ S.C. ROBINSON SHARPS
CARBINE

Country: United States

Date: circa 1862

Barrel Length: 22 in.

Caliber: .52

There were 5,000 copies of the
Northern Sharps carbine produced
in Richmond, Virginia.

dubious quality, which they sold to the Confederacy. The Shakanoosa Arms Company of Dickson, Alabama, manufactured so-called Mississippi rifles (Model 1841) and bayonets. It had to relocate and ended up in Dawson, Georgia, in 1864. Some of the larger Confederate arms operations were captured federal facilities.

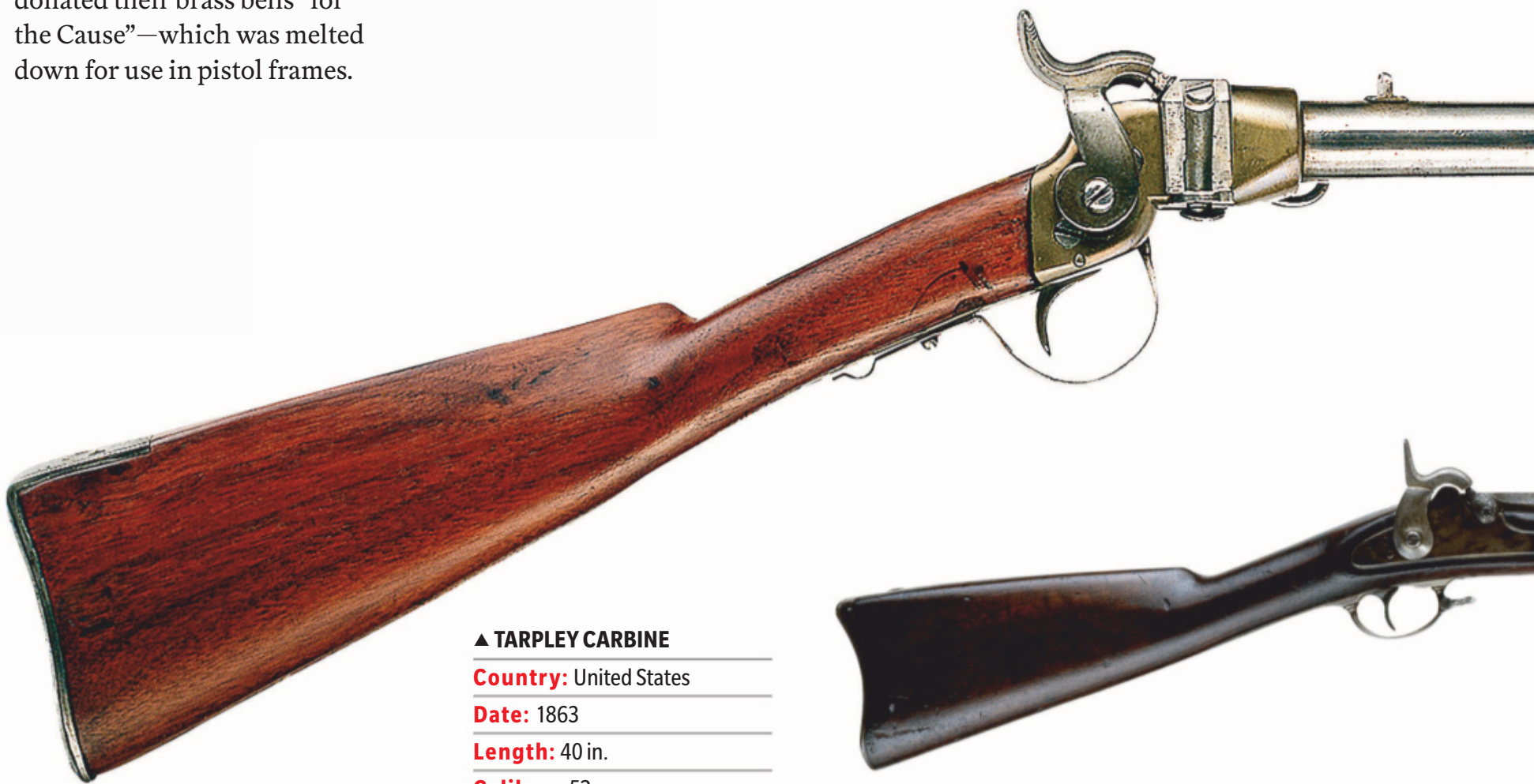
**Leech & Rigdon,
also known as
Memphis Novelty
Works, made imitation
Colt revolvers of
dubious quality.**

In April 1861, North Carolina forces seized the U.S. arsenal at Fayetteville. This victory added some 36,000 muskets and rifles to Confederate stores. Machinery captured from the takeover of the Harpers Ferry Arsenal was shipped to Fayetteville, which soon began rifle production of its own. ■

CONFEDERATE FIREARMS

Production problems proved hard to overcome for the South.

The South not only lacked factories to make guns when the war broke out but did not have a ready supply of crucial materials such as steel. Sometimes iron was substituted, and sometimes brass—thanks in part to churches that donated their brass bells “for the Cause”—which was melted down for use in pistol frames.



▲ TARPLEY CARBINE

Country: United States

Date: 1863

Length: 40 in.

Caliber: .52

Only a few hundred of these Confederate-made breech-loaders were produced.



It resembles the British Enfield.

▲ CHARLES INGRAM
VOLUNTEER PATTERN RIFLE

Country: Scotland

Caliber: .52

Crafted by Scottish marksman Charles Ingram, these imports were prized by Southern sharpshooters.



▲ FAYETTEVILLE MUSKET

Country: United States

Date: 1864

Length: 49 in.

Caliber: .63

Based on the Springfield, this musket was made from machinery and tools pilfered from the Harpers Ferry armory.

A single-shot muzzle-loader.

Unfinished brass barre.



Fitted with a British Enfield barrel.



The rifle-sling attachment paired with a hook on the trigger guard.

▲ RICHMOND MUSKET

Country: United States

Date: 1861

Length: 56 in.

Caliber: .577

The Richmond Armory also cobbled together Springfield knockoffs with equipment raided from Harpers Ferry.

KILLING FIELDS

Breech-loading infantry firearms, repeating rifles, and rudimentary rapid-fire guns led to a staggering death toll during the Civil War.

1861 February: Confederate States of America formed; Jefferson Davis sworn in as president.



1861 July: The Battle of First Manassas (Bull Run), Virginia, claimed 4,900 casualties.



1862 September: The Battle of Antietam Creek, Sharpsburg, Maryland, totaled 23,000 casualties in a single day.



1861

1862

1863



1861 April: Confederate troops fired on Fort Sumter in Charleston Harbor, South Carolina. President Abraham Lincoln ordered a blockade of Confederate ports.



1862 August: The Battle of Second Manassas (Bull Run), Virginia, claimed 25,000 casualties.



1863 January: Lincoln signed the Emancipation Proclamation.

1863 July: The Battle of Gettysburg, in Pennsylvania, resulted in 51,000 casualties (top photo below).
July 1-3: The Siege of Vicksburg, in Mississippi (bottom), had 37,000.



1864 November: Lincoln is reelected.



1865 March: Battle of Petersburg, Virginia (top photo below). The Confederacy authorized the arming of slaves as rebel soldiers (bottom).



1864

1865

1866



1864 July: The Confederate raid on Washington, D.C., ended with 9,000 casualties; the battles for Atlanta had 20,000 casualties.



1865 April: Confederate General Robert E. Lee (above) surrendered at Appomattox Courthouse in Virginia. Five days later, Confederate sympathizer John Wilkes Booth (right) assassinated Lincoln in Washington, D.C.



PATENT MODEL OF THE GATLING GUN

Designed by Richard Gatling in 1862, this wooden patent prototype was 36 inches long, with six 11½-inch barrels. An improved model was officially adopted by the U.S. Ordnance Department four years later.



THE BIRTH OF RAPID-FIRE WEAPONS

Hoping to reduce the toll of infections, a nonpracticing physician created a more efficient gun.

Another innovation spurred by the Civil War was the rapid-fire gun, a precursor to the modern machine gun. Manually operated by means of a crank, these weapons had multiple barrels and were capable of unleashing 100 rounds a minute—assuming, of course, they didn't jam. Richard Gatling, an eccentric inventor and nonpracticing physician, introduced the best-known model in 1861. Gatling's original creation had six

barrels and fired paper-wrapped cartridges. The action of the crank caused the barrels to revolve around a cylindrical shaft as cartridges dropped into place from above and were struck by the firing pin.

Union military leaders rejected the Gatling Gun in 1862 because they thought it was too heavy and complicated to operate. It didn't help the weapon's reputation that Gatling, who lived and worked in Indianapolis, was rumored to be a Confederate

sympathizer because he had been born in North Carolina. Individual Union commanders bought a handful of Gatling guns on their own, and the weapons played a role, albeit limited, during the Union siege of Petersburg, Virginia, in 1864.

Later, 10-barrel Gatling variations fired metallic cartridges from a drum-shaped magazine at a rate of up to 1,000 rounds a minute. The U.S. Army used them to deadly effect in Cuba during the Spanish-American War of 1898. ■

RICHARD GATLING: FATAL FIRE

Inventor Richard Gatling (1818–1903) not only designed machines for planting rice and wheat but transferred those concepts to the field of firearms, developing the precursor to the machine gun.

As the Civil War unfolded, Gatling noted that more men were dying from disease than weapon fire. He came up with the unusual notion that a rapid-fire gun would require fewer men to pull the trigger, reducing the toll of fatal infections. “If I could invent a machine—a gun—which could by its rapidity of fire, enable one man to do as much battle duty as a hundred... it would, to a large extent supersede the necessity of large armies,” he wrote.

As it turned out, Gatling’s gun did more to multiply death by bullet than to reduce fatalities attributable to disease. In 1870, he sold his patents for the machine to Colt.



6

FIREARMS AND THE WILD WEST

To conquer new territory and battle Native Americans, settlers and cattlemen relied on Winchesters, Sharps, and Colts.



Buffalo Bill (far left), General Nelson Miles of the U.S. Army (center), and officers survey the aftermath of the December 29, 1890, Wounded Knee massacre that killed 300 Sioux men, women, and children.





THE ROLE OF WEAPONS IN THE WILD WEST

In the years after the Civil War, civilians, soldiers, and outlaws used Oliver Winchester's lever-action rifles.

Cowboys and Indians, outlaws and marshals, federal troops and land-hungry settlers—all were characters of mythic proportion during the late-19th-century surge of population from East to West. In the sweep of imagination and in quite a bit of actual

experience, guns played a central role in the era of the Wild West.

It was the age of Colt six-shooters, Winchester lever-action repeaters, and Sharps rifles that could take down a charging bison with a single well-placed shot. A romantic attachment to firearms—and the violence

they begot—was woven into American popular culture.

No man had a greater influence on the weaponry of the West than Oliver Winchester, an East Coast shirt manufacturer who diversified into the gun business by investing in the Volcanic Repeating Arms



A factory cutaway reveals a 15-round tubular magazine under the barrel.

A combination trigger guard and firing lever.

◀ WINCHESTER MODEL 1873

Country: United States

Date: circa 1873

Barrel Length: 24 in.

Caliber: .44

Manufactured from 1873 to 1919, this lever-action rifle was also made as a carbine and rifled musket. It competes with the 1873 Colt Single Action Army .45 for the title “the gun that won the West.”

Company, a division of Smith & Wesson. When Winchester took control of Volcanic in 1856, he changed its name to the less evocative Winchester Repeating Arms, and based it in New Haven, Connecticut. Among his many talented craftsmen, Winchester employed

Benjamin Tyler Henry, designer of the lever-action repeating Henry rifle, which saw action during the Civil War.

After the Union prevailed, Winchester introduced a series of lever-action rifles that became popular in the West among civilians,

soldiers, bandits, and lawmen. The Winchester Model 1866, a descendant of the Henry rifle nicknamed “Yellow Boy” because of the color of its brass receiver, could hold fifteen .44-caliber rim-fire cartridges in its tubular magazine, more than twice the seven-round capacity of its



▲ **WINCHESTER MODEL
1895 CARBINE**

Country: United States

Date: late 19th century

Barrel Length: 22 in.

Caliber: .30

This rifle is chambered for a variety of military and hunting cartridges.

A brass frame and
buttplate.



▲ **WINCHESTER YELLOW BOY**

Country: United States

Date: 1866–1900

Caliber: .44



▲ **WINCHESTER MODEL 1873
LEVER-ACTION RIFLE**

Country: United States

Date: 1891

Barrel Length: 24 in.

Caliber: .44

More than 720,000
were manufactured.

famous predecessor. Armed with that amount of firepower, the skilled gunman was a force to be reckoned with.

Winchester's subsequent Model 1873 discharged an even more effective center-fire cartridge, also .44 caliber, and became the most prominent rifle of the last quarter of the century. The weapon was so influential that it shared the honorific "the gun that won the West," with Sam Colt's Single Action Army revolver.

Other notable rifles of the Wild West era included the Sharps 1859 carbine, which was popular with

scouts and hunters and even starred in some movies, like *True Grit* (1969) and *Valdez Is Coming* (1971). Some Sharps carbines incorporated a hand-cranked grinder in the gun's stock, a curious feature once thought to be a coffee mill but now assumed to be used for grinding wheat or corn. Buffalo hunters tended to prefer the Sharps .50 caliber—"the Big Fifty"—which supposedly could kill a bison at a distance of 200 yards.

Eliphalet Remington (1793–1861) of upstate New York designed a single-shot rifle bearing his

name and manufactured by his family-owned company in the town of Ilion. Popular in the West in the 1860s and 1870s, durable Remington rifles were also purchased in large numbers by European governments. Over the generations, what became the Remington Arms Company branched out to manufacture typewriters, cash registers, and cutlery. But Remington continued to make firearms as well, and today, Remingtons are produced by a descendant company based in North Carolina. ■



OLIVER WINCHESTER: EMPIRE BUILDER

A sharp-eyed businessman, Oliver Winchester (1810–1880) got into the gun business by snapping up a financially troubled division of Smith & Wesson, Volcanic Repeating Arms, and turning it into an eponymous firearm empire. During the Civil War, the Union Army bought some of the company's repeating Henry rifles for its troops, but conservative-minded military officials generally equipped infantrymen with single-shot weapons thought to be easier to use. Winchester's fortunes as a gunmaker improved after the war, when civilians moving west adopted repeating weapons such as the Winchester Model 1873 to battle Native Americans.

After Winchester died, ownership of his company passed to a son, William, who himself died shortly thereafter, a victim of tuberculosis. William's wife, Sarah, became convinced the family bore a curse cast by spirits of the legions killed over the decades with Winchester rifles. She moved to San Jose, California, and built a bizarre mansion, the Winchester Mystery House, a vast dwelling with 160 rooms, doors that opened on to walls, and stairways to nowhere. Sarah apparently thought she could hide there from hostile mystic forces seeking revenge against Oliver Winchester's heirs.

The house today is a tourist attraction and the Winchester brand remains alive, a reminder of the Old West, albeit in a license agreement with a Belgian-based group.



A statue in the garden at the Winchester Mystery House was installed to help appease spirits of Native Americans killed by Winchester guns.

THE OTHER SIDE OF THE LAW

Weapons used by bandits and gang members like Jesse James and Billy the Kid were as famous as their owners.

Old West outlaws preyed on banks, trains, and stage-coaches. In off hours, they frequented saloons, where gambling disputes and severe inebriation led to further gunplay. Jesse James, a former Confederate bushwhacker who formed a criminal gang with his brother Frank, used a distinctive .45-caliber Smith & Wesson Schofield revolver. Tom “Black Jack” Ketchum, an affiliate of the Hole-in-the-Wall gang, carried the most famous of the Old West revolvers, the Colt .45 Single Action Army. John Wesley Hardin also preferred a Colt, but his was a .41-caliber Model 1877 double-action revolver.

Billy the Kid (Henry McCarty), known for his mild demeanor when he wasn’t murdering people, likewise carried the Colt .41, nicknamed “the Thunderer,” as well as a Winchester Model 1873 rifle. The dapper train robber Butch Cassidy (Robert Leroy Parker) surrendered his Colt .45 Single Action Army to a sheriff in Utah as part of a failed bid for amnesty; when the deal fell through, he and his partner, Harry Alonzo Longbaugh, a.k.a. the Sundance Kid, returned to their life of crime using other Colt weapons and Winchester rifles—models 1873, 1894, and 1895.



Hard-rubber grips.



▲ SMITH & WESSON SCHOFIELD

Country: United States

Date: late 1876

Barrel Length: 7 in.

Caliber: .45

Jesse James carried a Smith & Wesson Schofield.



▲ **COLT THUNDERER**

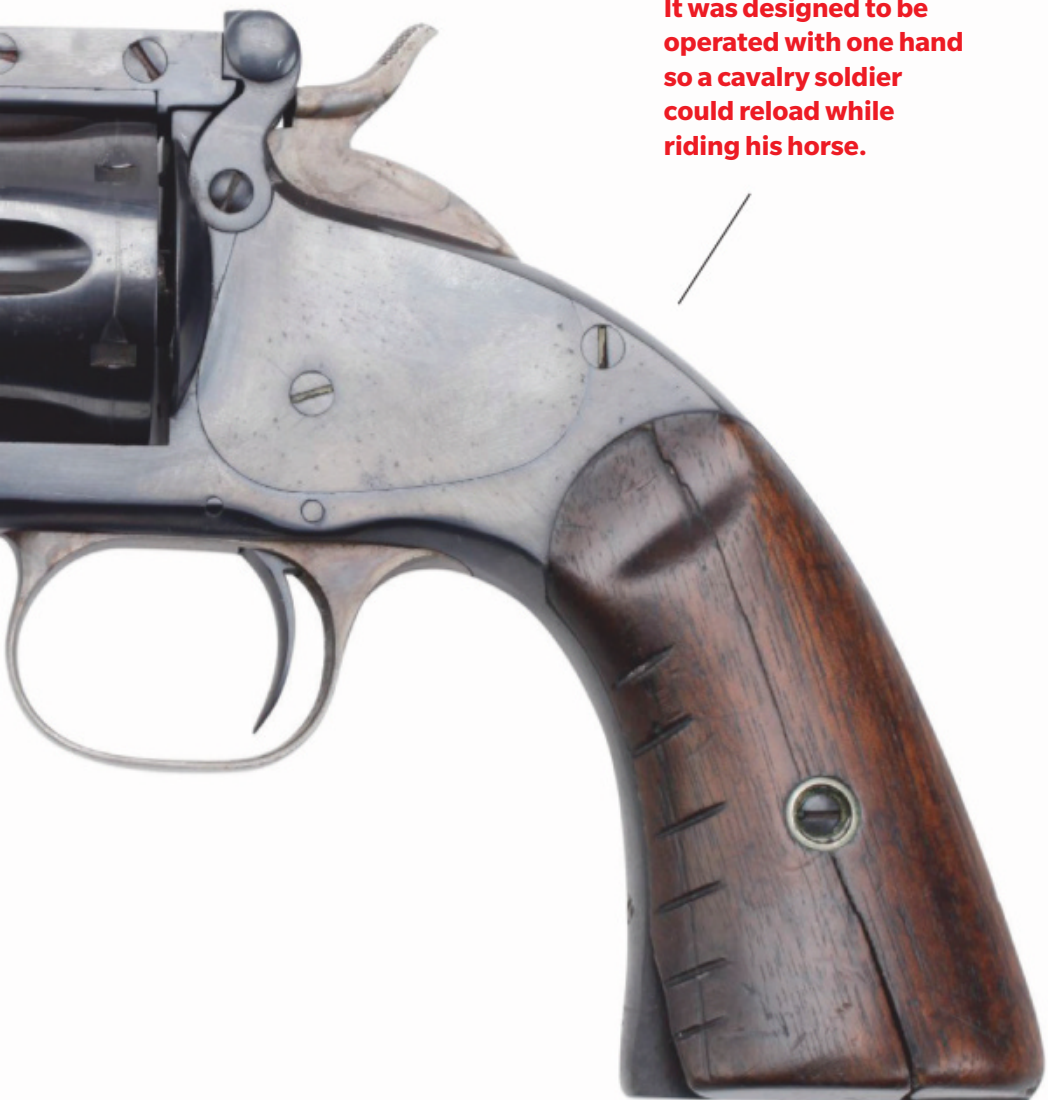
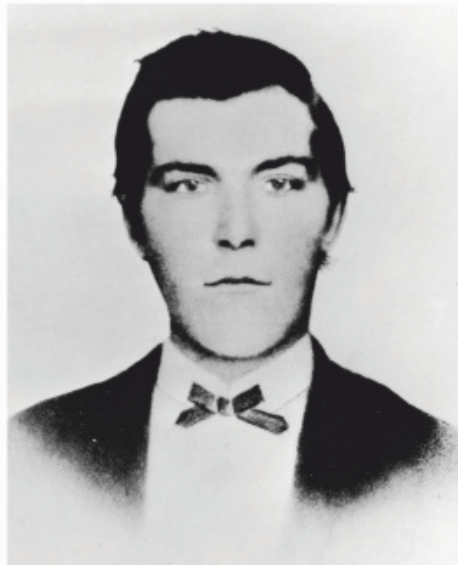
Country: United States

Date: circa 1879

Barrel Length: 4 ½ in.

Caliber: .41

John Wesley Hardin used a six-shot, double-action Colt Thunderer to rob a high-end crap game in El Paso, Texas, in 1895.



It was designed to be operated with one hand so a cavalry soldier could reload while riding his horse.



In this image of Billy the Kid, he carries a holstered Colt Single Action Army, and he leans on his 1873 Winchester carbine.



▲ REMINGTON NO. 1 ROLLING
BLOCK SINGLE-SHOT RIFLE

Country: United States

Date: 1868–1888

Barrel Length: varied

Remington offered its No. 1 action rifle in more than 30 different calibers. It sold more than 1 million copies worldwide.

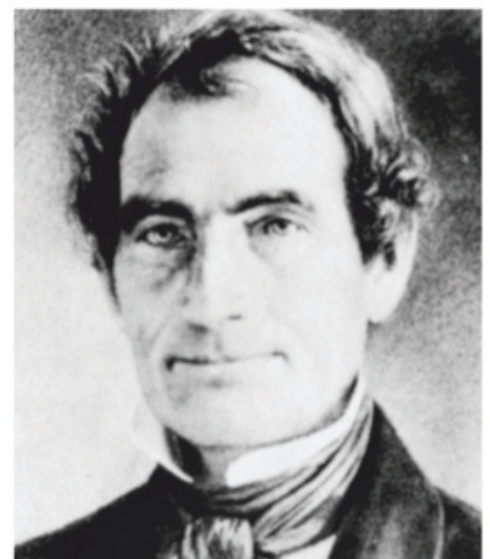
THE RULE OF REMINGTON

The Civil War helped spur the growth of an influential family gunmaking business.

An archetypal New England gunmaker, Eliphalet Remington (1793–1861) initially followed his father into the blacksmithing trade in rural upstate New York. At 23, the younger Remington bought a flintlock firing mechanism from a nearby gunsmith, fashioned a barrel to go with it, and produced his first rifle. The weapon worked well enough that he decided to manufacture rifles, forming E. Remington & Sons with his own offspring. Eliphalet and his son

Philo produced the first successful cast-steel drilled rifle barrel made in the U.S.

The onset of the Civil War created demand for Remington's products, as it did for those of Colt, Sharps, and other highly regarded gunmakers. After the founder's death in 1861, what became known as Remington Repeating Arms Company and later just Remington Arms made guns for the Union in the Civil War and the U.S. military during World War I and World War II.



Eliphalet Remington



An octagonal barrel.

▲ REMINGTON NEW MODEL
PERCUSSION RIFLE

Country: United States

Date: circa 1865

Caliber: .36 and .44

Only about 1,000 of these New Model rifles were produced.



▲ REMINGTON NEW MODEL
ARMY REVOLVER

Country: United States

Date: 1863–1875

Barrel Length: 8 in.

Caliber: .44

This military sidearm was sold commercially to civilians after the Civil War. “It never failed me,” Buffalo Bill said of the revolver he used for 43 years.



The Remington Arms Company assembly room in 1917.



The plant, which once employed more than 17,000 people, closed in 1986.



GUNS AT LITTLE BIGHORN

Though repeating rifles were available, soldiers were equipped with single-shot models to save on ammunition.

The now politically incorrect term “cowboys and Indians” typically conjures the Wild West era. But it was far more common in the late 19th century for units of the U.S. Army to confront Native Americans in battles for territory and dominance—and militarily, the Plains Indians outwitted, outplanned, and outmaneuvered the cavalrymen. At the 1876 Battle of Little Bighorn, for example, a combined force of Lakota, Cheyenne, and Arapaho warriors vanquished 700 men under the command of George Armstrong Custer. Five of the dozen companies of the 7th U.S. Cavalry were

wiped out, with 263 Army soldiers killed, including Custer. About 40 to 50 Native Americans are thought to have died in the confrontation.

A number of factors contributed to the debacle known as Custer’s Last Stand. Custer ignored warnings from his scouts, his command was riven by internal rivalries, and most fatally, he divided his forces. The deployment of firearms also played a role. Custer’s cavalry troops went into battle with breech-loading, single-shot Springfield Model 1873 carbines and .45 caliber Colt 1873 Single Action Army revolvers. Repeating rifles designed by Henry,

Spencer, and Winchester were all available at the time, but the post-Civil War U.S. Army’s ordnance department stuck with a single-shot rifle as its standard, in part because the Springfield was relatively inexpensive to manufacture but also because they thought soldiers armed with single-shot weapons would be less likely to waste ammunition.



Lieutenant Colonel George A. Custer and 262 7th Cavalry soldiers were outmanned and outgunned at the Battle of Little Bighorn in Montana in 1876.



Army officers were also following the lead of European militia, which generally avoided repeating weapons. Custer rejected an offer to add rapid-fire Gatling Guns to his arsenal, telling an Army colleague that bulky wheeled Gatling Guns would “hamper our movements.” The 7th Cavalry, a cocky Custer added, “can handle anything it meets.”



The Little Bighorn Battlefield National Monument, with tributes to Native Americans and the 7th U.S. Cavalry.



▼ SHARPS 1856 CARBINE

Country: United States

Date: 1856

Barrel Length: 17⁹/₁₀ in.

Caliber: .56



The several Native American groups came to the fight at Little Bighorn with an extraordinary array of weapons purchased and scavenged over time. Some of the warriors carried the traditional bow and arrow, and when the dust settled, a number of Army dead resembled human pin-cushions. But the Native American warriors did far more damage with firearms. Hundreds of the mounted

tribe members carried rifles and revolvers, including Henrys, Sharps, Winchesters, Remingtons, Smith & Wessons, and even British Enfields (the last of these originally imported by the Confederate Army during the Civil War).

Historical accounts include the recollection of a Cheyenne warrior named Wooden Leg, who was armed with what he said was a “six shooter,”

probably a Colt revolver. White Cow Bull, an Oglala Lakota warrior, claimed to have a repeating rifle. All told, historians have found evidence of 62 Indian-owned .44-caliber Henry repeaters and twenty-seven .50-caliber Sharps rifles. Survivors emphasized that the native warriors were able to fire more rounds more quickly than the confused men under Custer. “The Indians had



▼ **SPRINGFIELD MODEL 1873
"TRAPDOOR" RIFLE**

Country: United States

Date: 1876

Barrel Length: 32½ in.

Caliber: .45



The classic cavalry
carbine of the Old West.

A walnut forearm.



▲ **SHARPS BIG 50 RIFLE**

Country: United States

Date: 1872

Caliber: .50

Shooters could hit
a target more than
1,000 yards away.

Up to 60 million bison were killed in the latter half of the 19th century. Sharps .50-caliber rifles added to the carnage.

Winchester rifles, and [the Army] column made a large target for them, and they were pumping bullets into it," recalled Major Marcus Reno.

For a supposedly crack cavalry unit, the U.S. 7th betrayed a distinct lack of skill with those weapons it did possess. Before Little Bighorn, the military allotted only 20 rounds per soldier for training. "Those were the good old days," one Army veteran

**Survivors reported
that native warriors
were able to fire
more rounds more
quickly than the
confused troops
under Custer.**

recalled of the 1870s. "Target practice was practically unknown."

In the end, of course, the Native American military prowess was not enough to defeat the Army and arriving settlers. Bison hunters exterminated their food supply, eventually starving tribes. With no immunity to European diseases, thousands more were killed by typhus and smallpox.

SHOWDOWNS AND SURE-SHOTS

High-octane gunfights were as much a part of the Old West as cowboys, wagon trains, buffalo hunters, and railroads.

1875 Phoebe Ann Moses outshoots rival marksman Frank Butler, then marries him the next year. She later takes the name Annie Oakley.



1876 Wild Bill Hickok was shot and killed during a poker game in Deadwood, Dakota Territory.



1882 Hoping to collect a \$10,000 reward, outlaw Bob Ford killed gang leader Jesse James (pictured).



1892 Residents of Coffeyville, Kansas, shot and killed four members of the Dalton Gang after the outlaws tried to rob two banks in the town simultaneously.



1870

1875

1880

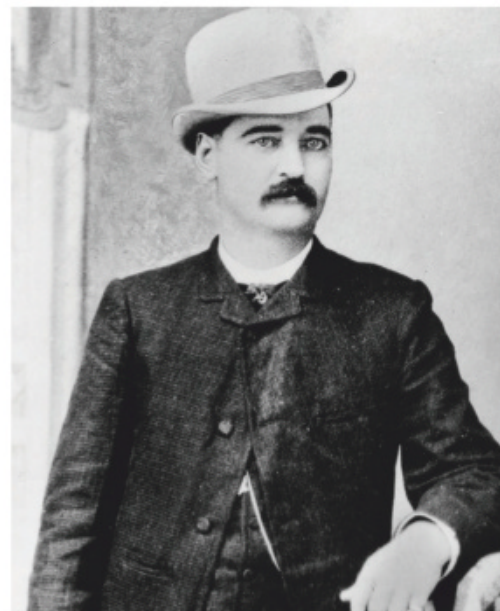
1885

1890

1895



1871 Abilene marshal "Wild Bill" Hickok tried to censor a painting in gambler Phil Coe's saloon of a bull with unusually large testicles; Coe was killed in the shoot-out that followed.



1874 Bison hunters including lawman Bat Masterson shot it out with Comanche at the Second Battle of Adobe Walls.

1877 Claiming self-defense, Billy the Kid, 17, killed his first victim in a saloon fight in Fort Grant, Arizona.



1881 The Gunfight at the O.K. Corral, perhaps the most famous shoot-out of the Wild West, unfolded over a brief 30 seconds behind a saloon in Tombstone, Arizona.



1889 Butch Cassidy (front, right) knocked over his first bank, in Telluride, Colorado.

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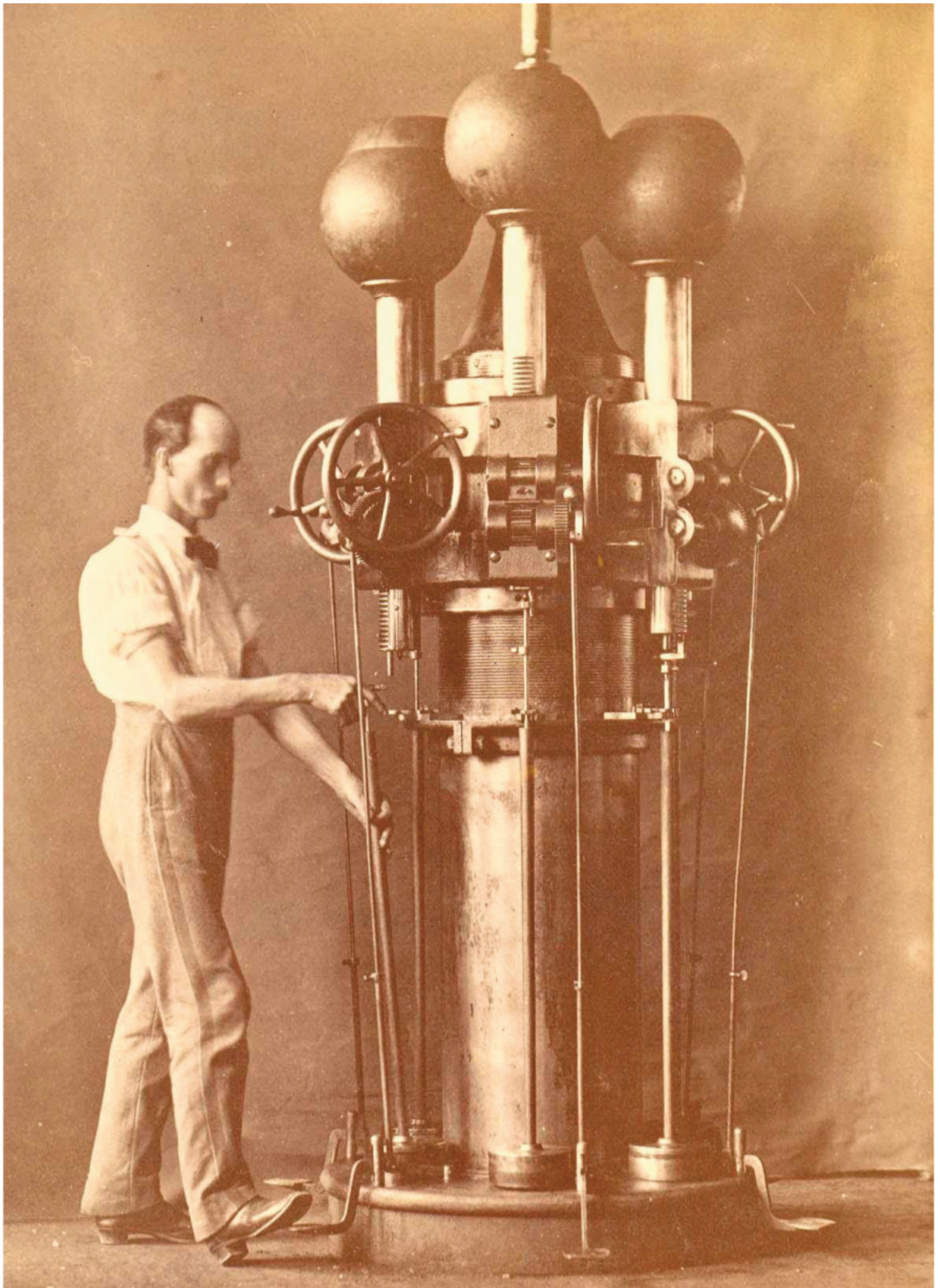
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THE BARREL RIFLING MACHINE



This rifling machine, which could cut grooves into four barrels at once, helped speed up production at the Colt factory. It was invented by Colt superintendent Elisha Root.

